

TOSHIBA

FILE NO. A10-9802

SERVICE MANUAL

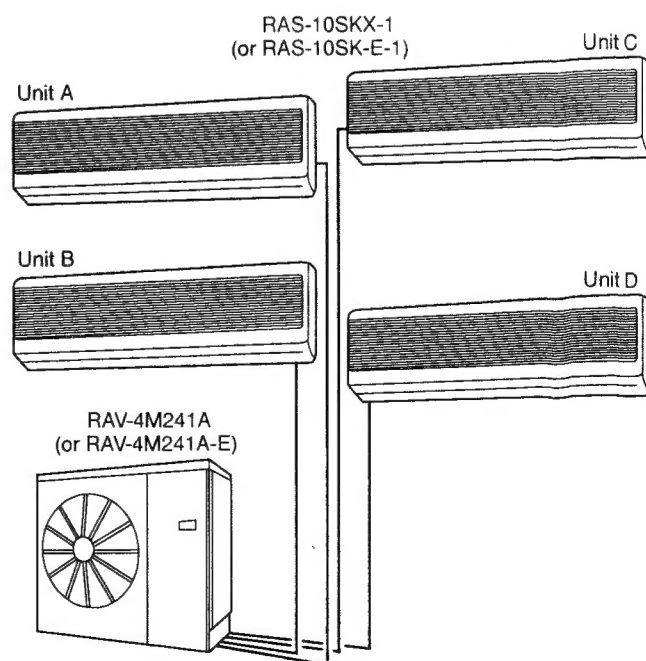
ROOM AIR-CONDITIONER SPLIT WALL TYPE

RAV-4M241A

(Combination with RAS-10SKX-1)

RAV-4M241A-E

(Combination with RAS-10SK-E-1)



CONTENTS

| | |
|--|----|
| 1. SPECIFICATIONS | 4 |
| 2. CONSTRUCTION VIEWS | 6 |
| 3. WIRING DIAGRAM | 7 |
| 4. SPECIFICATIONS OF ELECTRICAL PARTS | 9 |
| 5. REFRIGERANT PIPING DIAGRAM | 10 |
| 5-1. Refrigerant Piping | 11 |
| 6. UNIT INSTALLATION | 12 |
| 7. OPERATIONAL MATRIX OF ELECTRICAL PARTS | 13 |
| 8. TROUBLESHOOTING CHART | 15 |
| 8-1. What to be Prechecked First | 15 |
| 8-2. Primary Judgement of Trouble Sources | 16 |
| 8-3. Troubleshooting Flowcharts | 20 |
| 8-4. How to Check the Remote Control (Including the Indoor P.C. Board) | 25 |
| 8-5. P.C. Board Layout | 28 |
| 9. EXPLODED VIEWS AND PARTS LIST | 30 |
| 9-1. Indoor Unit | 30 |
| 9-2. Outdoor Unit | 31 |

1. SPECIFICATIONS

| Item | | | Model | RAV-4M241A / RAV-4M241A-E | | | |
|------------------------------------|--------------------------|--------------------|--|----------------------------|---|---------------|---|
| Operation | | | Unit | 2 indoor unit | | 4 indoor unit | |
| | | | A or B | C or D | A | B | C |
| | | | BTU/h | 9, 300 x 2 | | 6, 100 x 4 | |
| Cooling capacity | | | BTU/h | 18, 600 | | 24, 400 | |
| | | | kW | 5,4 | | 7,1 | |
| Power source | | | Phase | Single | | | |
| | | | V | 220 — 240 | | | |
| | | | Hz | 50 | | | |
| Power consumption | | | kW | 2,39 | | 2,5 | |
| Power factor | | | % | 98 | | 98,8 | |
| Running current | | | A | 10,6 | | 11 | |
| Starting current | | | A | 58 | | 58 | |
| Operating noise (SPL) Outdoor unit | | | dB (A) | 53 | | | |
| Refrigerant | Name of refrigerant | | R-22 | | | | |
| | Charge volume | kg | 0,9 (A or B) + 0,9 (C or D) | | | | |
| | Additional charge | | Chargeless | | | | |
| | Refrigerant control | | Capillary tube | | | | |
| Inter connecting pipe | Gas side size | mm (in.) | ø9,52 (3/8") | | | | |
| | Coupler style | | Flare connection | | | | |
| | Liquid side size | mm (in.) | ø6,4 (1/4") | | | | |
| | Coupler style | | Flare connection | | | | |
| | Standard length | m (ft) | 7,6 (25) | | | | |
| | Maximum length (One-way) | m (ft) | A + B < 15 (48), A – B < 8 (25,6), C + D < 15 (48), C – D < 8 (25,6) A or B or C or D < 10 (32) | | | | |
| | Minimum length (One-way) | m (ft) | 2 (7) | | | | |
| | Max. height | Indoor unit higher | m | 5 (16) | | | |
| Outdoor unit higher | | m | 5 (16) | | | | |
| Condensed drain pipe size (OD) | | | mm | ø32 | | | |
| INDOOR UNIT MODEL | | | | RAS-10SKX-1/RAS-10SK-E-1 | | | |
| OUTDOOR UNIT MODEL | | | | RAV-4M241A/RAV-4M241A-E | | | |
| Dimensions | Height | mm | 790 | | | | |
| | Width | mm | 880 | | | | |
| | Depth | mm | 310 | | | | |
| Net weight | | | kg (lbs) | 70 (154,3) | | | |
| Heat exchanger type | | | | Finned tube | | | |
| Condenser fan type | | | | Propeller fan | | | |
| Air volume | | | m³/h (CFM) | 2,700 (1,600) | | | |
| Fan motor output | | | W | 63 | | | |
| Compressor | Model | PH160X2-4L x 2 | | | | | |
| | Output | W | 1,100 x 2 | | | | |
| Safety device | | | | Fuse, inner overload-relay | | | |

Specifications are subject to change without notice.

Note 1:

- Cooling capacity is based on the following temperature conditions. [Condition A]

| Evaporator air inlet temperature | | Condenser air inlet temperature |
|----------------------------------|---------------------|---------------------------------|
| 27°C DB (80°F DB) | 19,0°C WB (66°F WB) | 35°C DB (95°F DB) |

Note 2:

- These mean equivalent length.

Note 3:

- Operating range of the units

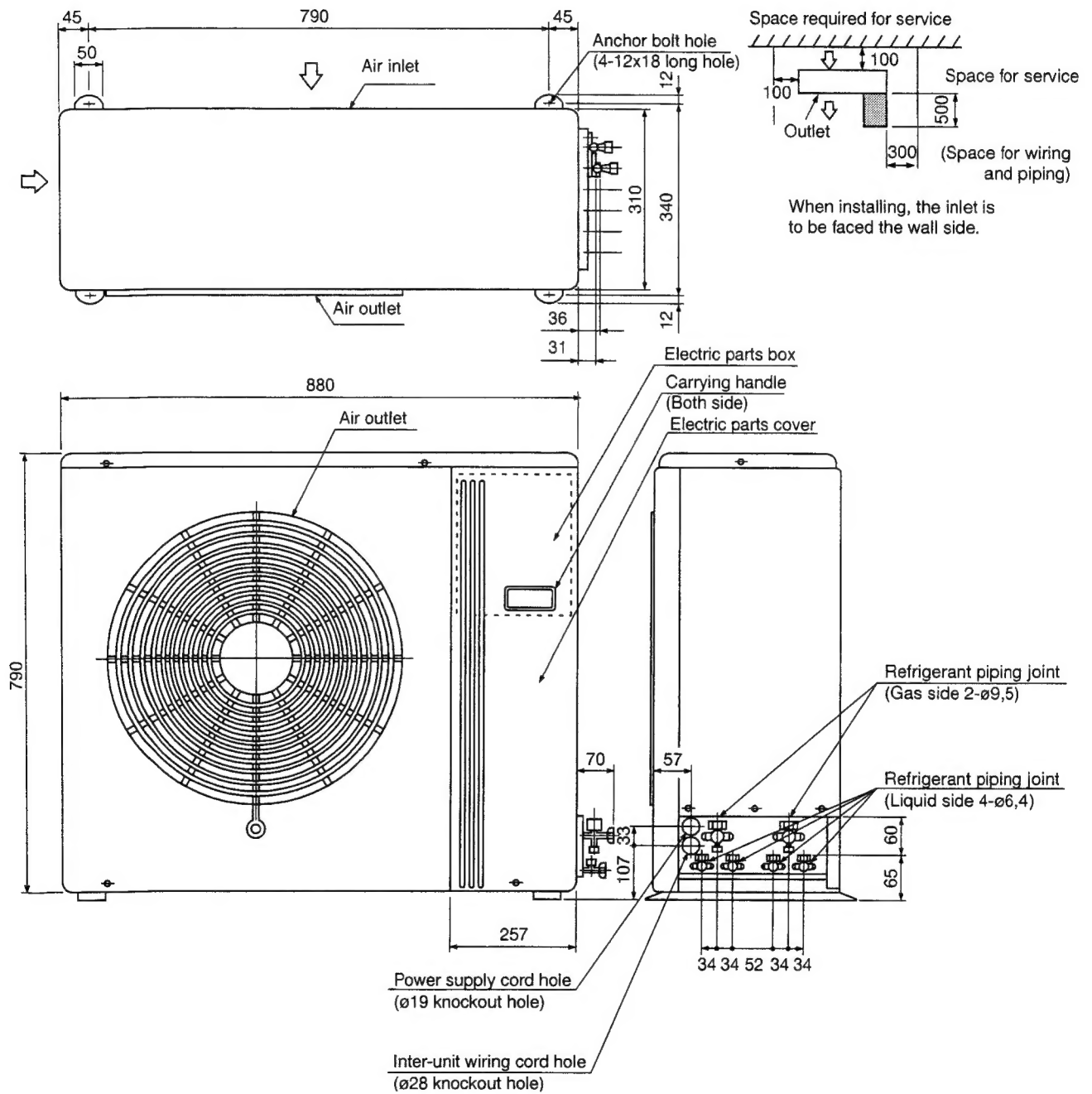
| | Evaporator air inlet temperature | Condenser air inlet temperature |
|----------------|--|---------------------------------|
| Maximum | 30°C DB, 22,5°C WB (86°F DB, 73°F WB) | 43°C DB (109°F DB) |
| Minimum | 21°C DB, 15,5°C WB (70°F DB, 60°F WB) | 21°C DB (70°F DB) |

Remark:

- Be sure to refer to the service manual file No. A03-9801 (or A00-9708) for the indoor unit RAS-10SKX/10SK-E (or RAS-10SKX-1/RAS10SK-E-1) to be connected.

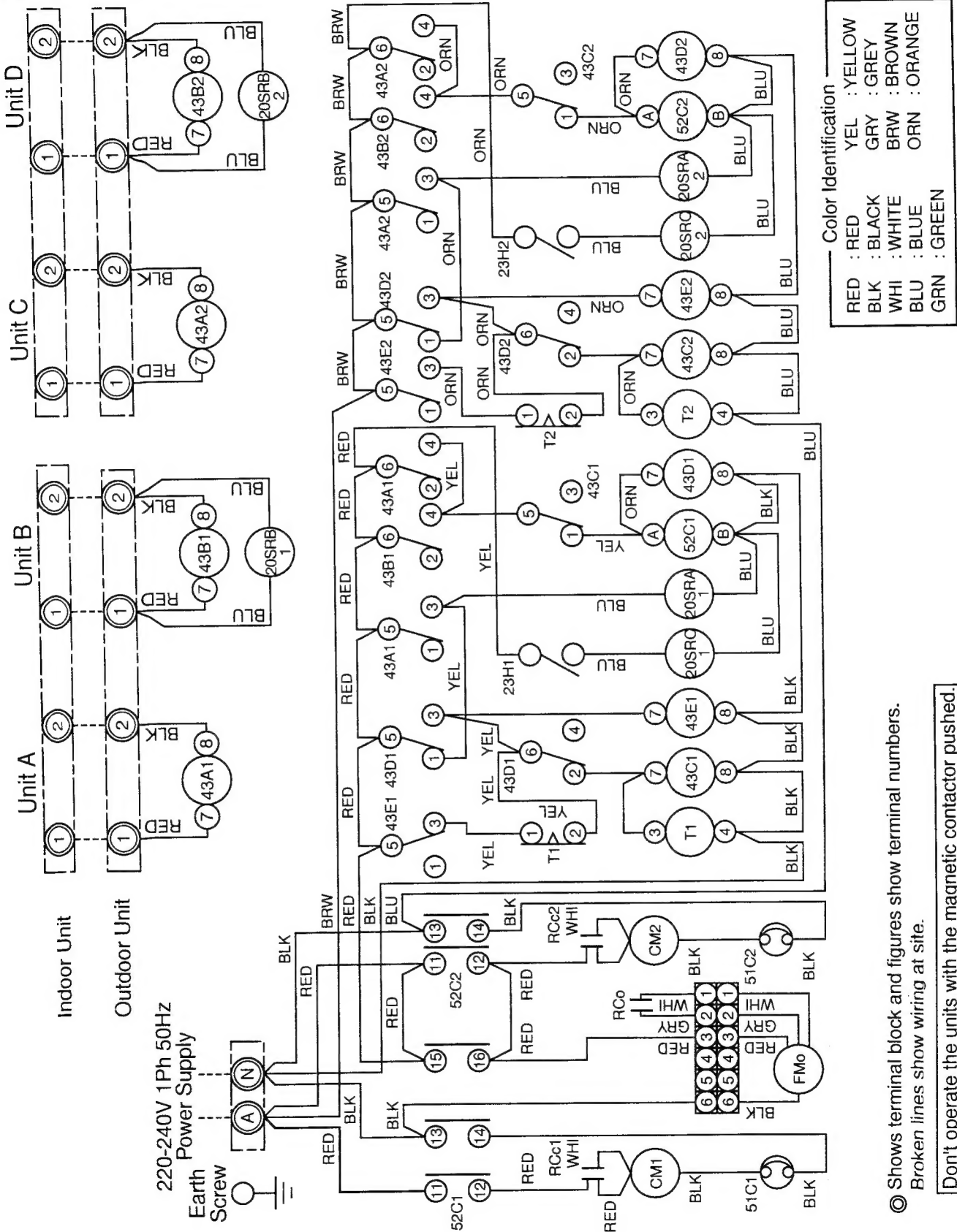
2. CONSTRUCTION VIEWS

Outdoor Unit



RAV-4M241A

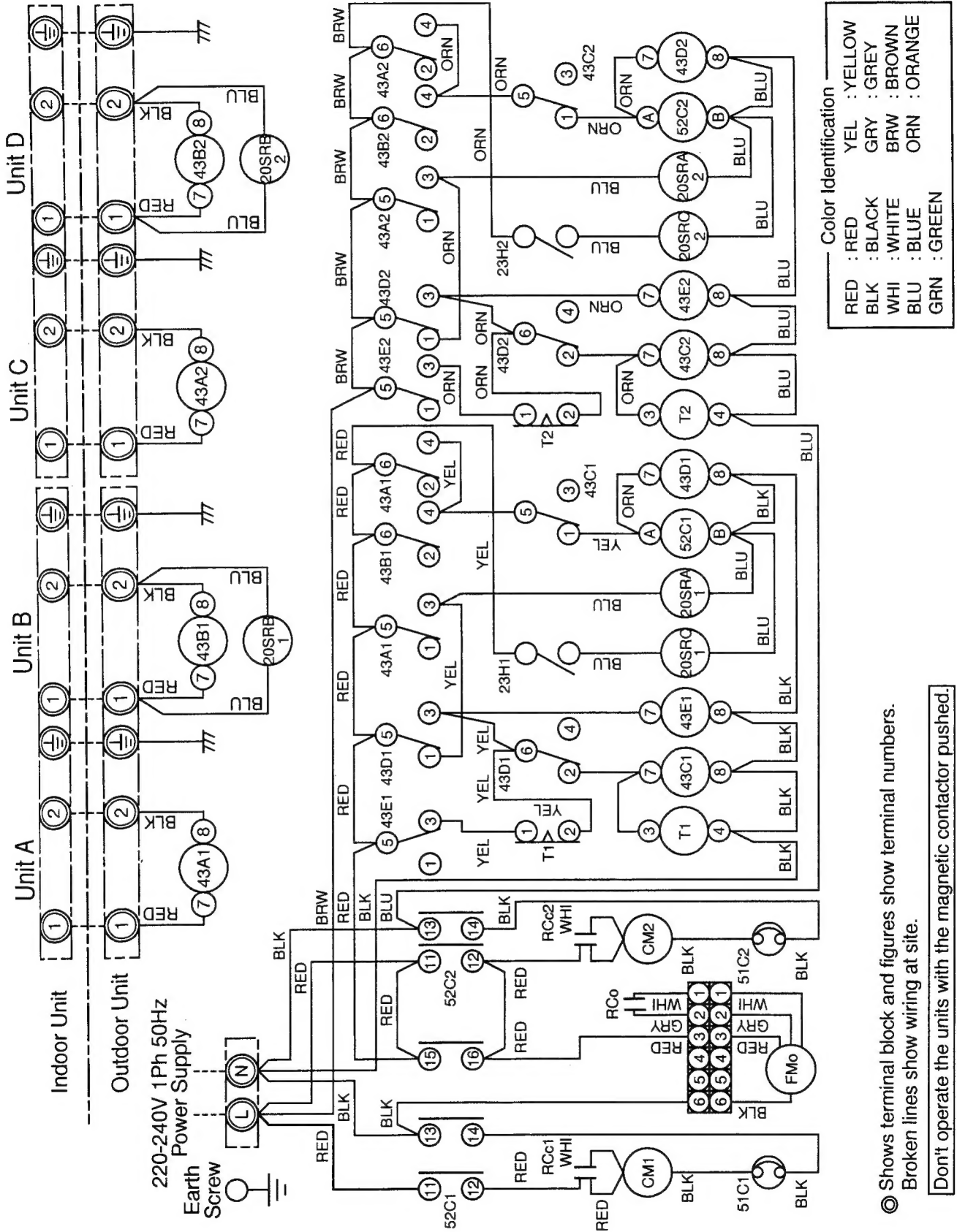
3. WIRING DIAGRAM



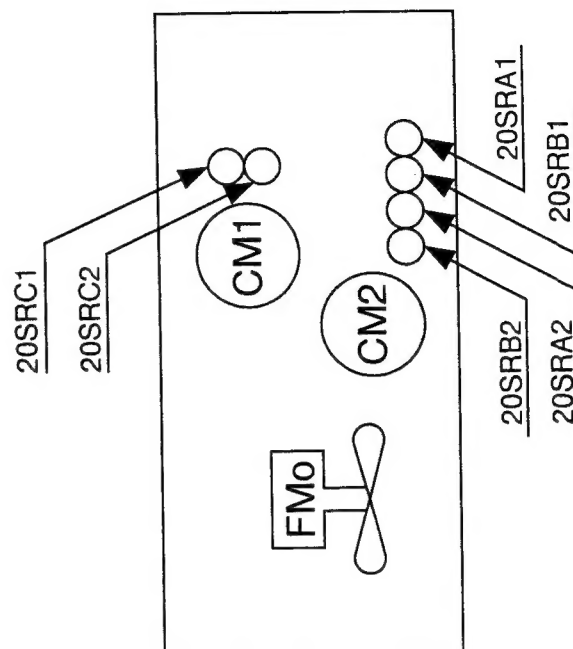
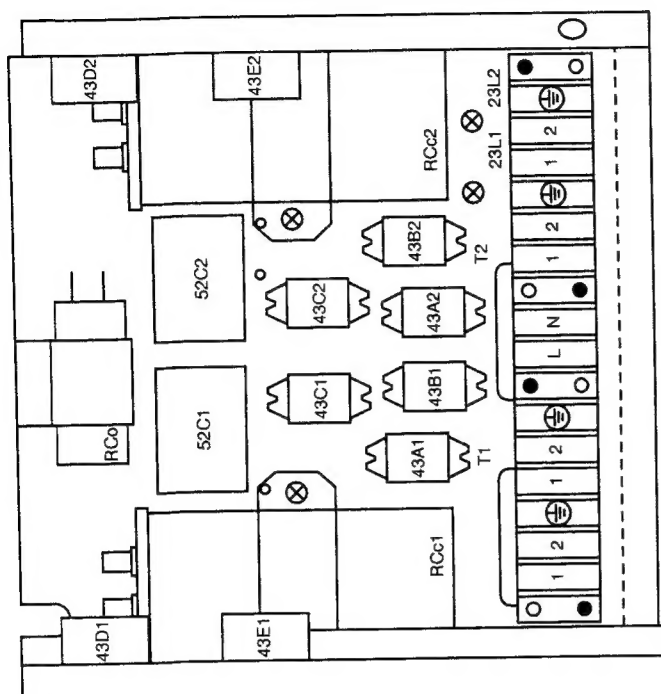
© Shows terminal block and figures show terminal numbers.
Broken lines show wiring at site.

Don't operate the units with the magnetic contactor pushed.

RAV-4M241 A-E

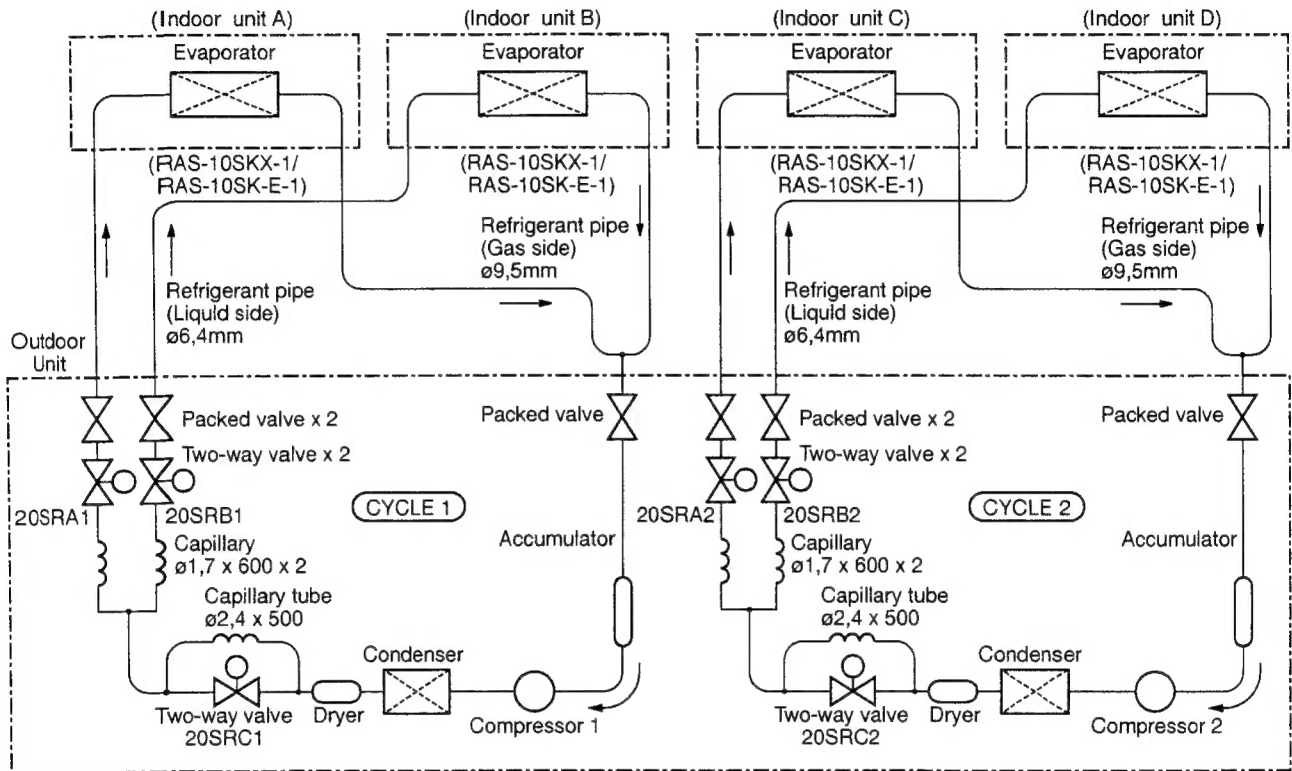


4. SPECIFICATIONS OF ELECTRICAL PARTS



| Symbol | Parts name | Type | Specifications |
|--------------------------------|--------------------------------|-----------------|---|
| CM1, 2 | Compressor 1, 2 | PH160X2-4L | Output 1,1kW, 2pole, 1ø, 220-240V, 50Hz Winding resistance: Main coil 2,2Ω, Aux. coil 3,5Ω |
| FMo | Fan motor | STF-200-63B | Output 63W, 6pole, 1ø, 220-240V, 50Hz |
| 52C1, 2 | Magnetic contactor | VC20FA | AC 240V 3P |
| RCc1, 2 | Capacitor | MT-40MP355W | For compressor 1, 2: PH160X2-4L, AC 400V, 35μF |
| RCo | Capacitor | EAG45M355UF1 | For fan motor, AC 450V, 3,5μF |
| 20SRA (1, 2) ~ 20SRC (1, 2) | Solenoid coil (2-way valve) | NEV AC240 | AC 220-240V |
| 43A (1, 2) ~ 43E (1, 2) | Relay | LY2F | Coil 220-240V, 50/60Hz |
| T1, 2 | Thermal timer | 230-B-206-4BFP1 | AC 220-240V, 3-min. (Delay) |
| 51C1, 2 | Overload relay | MRA99420 | Ultimate tripping, 8,4A (Terminal 1 - 2) at 100°C Tripping temp: 135 ± 5°C Resetting temp: 75 ± 11°C |
| 23H1, H2 | Bimetal thermostat | CS12 | 110°C ON, 95°C OFF |

5. REFRIGERANT PIPING DIAGRAM



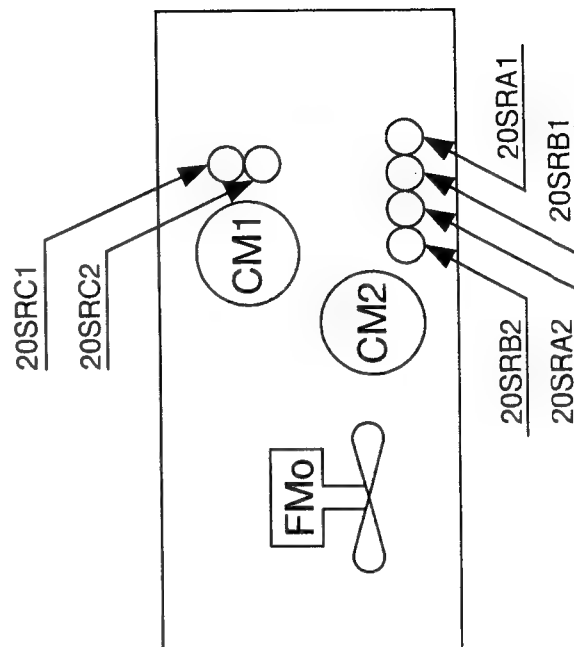
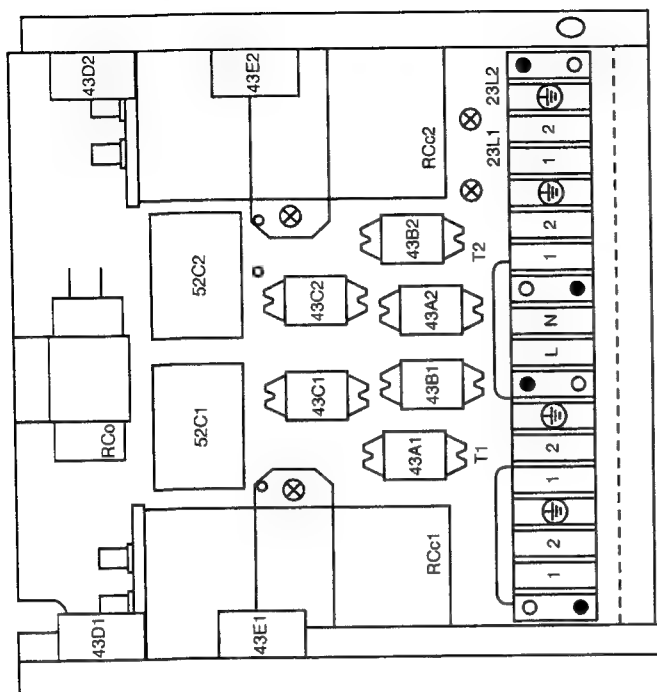
| | | Standard pressure P1 (kg/cm ² G) | Ambient temp. conditions DB/WB (°C) | |
|-----------|---------------|---|--|---------|
| | | | Indoor | Outdoor |
| ONE ROOM | Standard | 5,8 | 27/19 | 35/24 |
| | High pressure | 6,8 | 32/22,5 | 43/26 |
| | Low pressure | 4,5 | 21/15,5 | 21/15,5 |
| BOTH ROOM | Standard | 4,2 | 27/19 | 35/24 |
| | High pressure | 4,9 | 32/22,5 | 43/26 |
| | Low pressure | 3,1 | 21/15,5 | 21/15,5 |

| Compressor | Refrigerant rated volume |
|----------------|-----------------------------|
| PH160x2-4L x 2 | 0,9kg x 2 |

Remark:

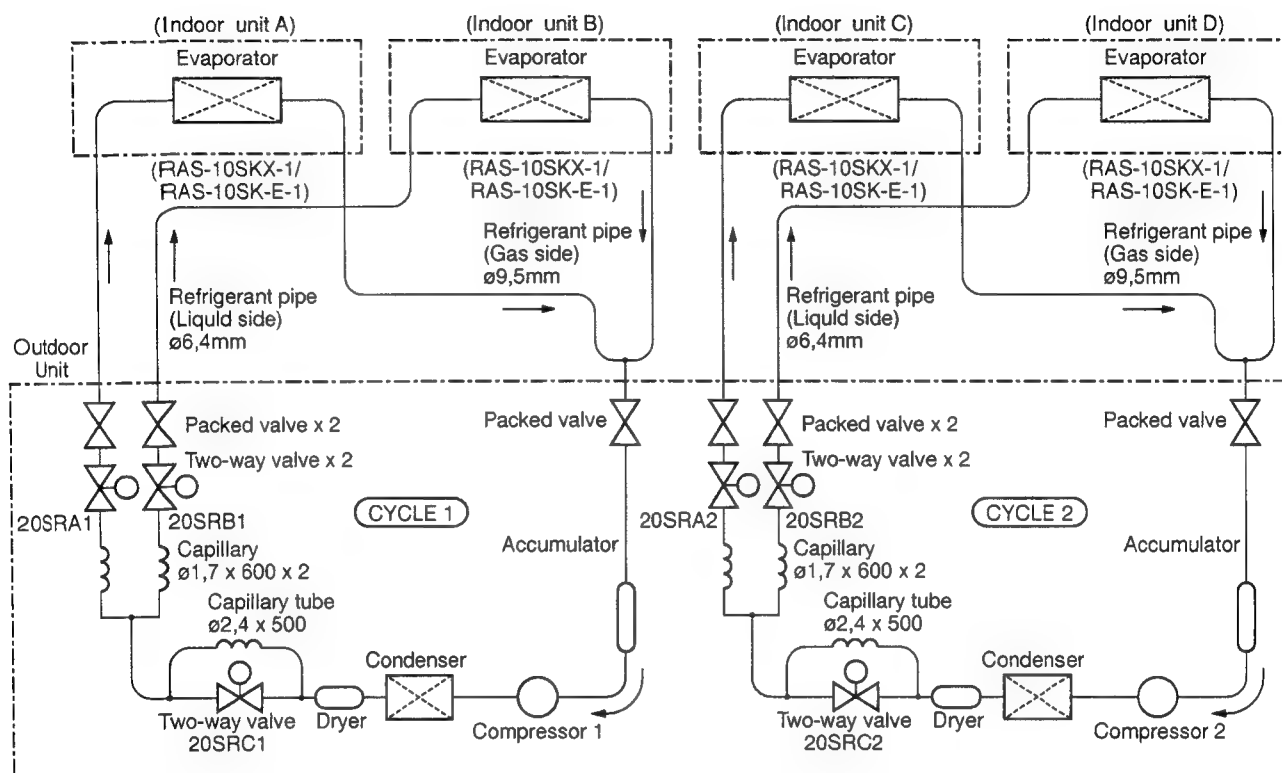
Interconnection piping length: 7,6m

4. SPECIFICATIONS OF ELECTRICAL PARTS



| Symbol | Parts name | Type | Specifications |
|--------------------------------|--------------------------------|-----------------|---|
| CM1, 2 | Compressor 1, 2 | PH160X2-4L | Output 1,1kW, 2pole, 1ø, 220-240V, 50Hz Winding resistance: Main coil 2,2Ω, Aux. coil 3,5Ω |
| FMo | Fan motor | STF-200-63B | Output 63W, 6pole, 1ø, 220-240V, 50Hz |
| 52C1, 2 | Magnetic contactor | VC20FA | AC 240V 3P |
| RCc1, 2 | Capacitor | MT-40MP356W | For compressor 1, 2: PH160X2-4L, AC 400V, 35μF |
| RCo | Capacitor | EAG45M355UF1 | For fan motor, AC 450V, 3,5μF |
| 20SRA (1, 2) ~ 20SRC (1, 2) | Solenoid coil (2-way valve) | NEV AC240 | AC 220-240V |
| 43A (1, 2) ~ 43E (1, 2) | Relay | LY2F | Coil 220-240V, 50/60Hz |
| T1, 2 | Thermal timer | 230-B-206-4BFP1 | AC 220-240V, 3-min. (Delay) |
| 51C1, 2 | Overload relay | MRA99420 | Ultimate tripping, 8,4A (Terminal 1 - 2) at 100°C Tripping temp: 135 ± 5°C Resetting temp: 75 ± 11°C |
| 23H1, H2 | Bimetal thermostat | CS12 | 110°C ON, 95°C OFF |

5. REFRIGERANT PIPING DIAGRAM



| | | Standard pressure P1 (kg/cm ² G) | Ambient temp. conditions DB/WB (°C) | |
|-----------|---------------|--|--|---------|
| | | | Indoor | Outdoor |
| ONE ROOM | Standard | 5,8 | 27/19 | 35/24 |
| | High pressure | 6,8 | 32/22,5 | 43/26 |
| | Low pressure | 4,5 | 21/15,5 | 21/15,5 |
| BOTH ROOM | Standard | 4,2 | 27/19 | 35/24 |
| | High pressure | 4,9 | 32/22,5 | 43/26 |
| | Low pressure | 3,1 | 21/15,5 | 21/15,5 |

| Compressor | Refrigerant rated volume |
|----------------|--------------------------|
| PH160x2-4L x 2 | 0,9kg x 2 |

Remark:
Interconnection piping length: 7,6m

5-1. Refrigerant Piping

5-1-1. Permissible Piping Length and Head

The minimum inter-unit refrigerant piping length shall be 2m.

Limit the number of bends in the refrigerant piping to 10 or less.

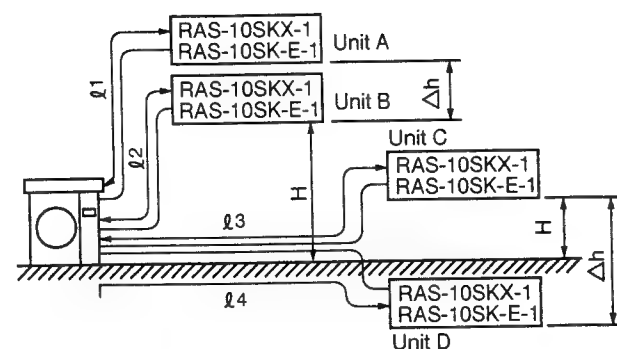


Fig. 5-1

Table 5-1

| Model | Connectable indoor unit number | Permissible piping length | Permissible difference pipe lengths | Permissible piping head (H) | Between units A and B piping head (Δh) | Remarks |
|-----------------------------|--------------------------------|--|--|-----------------------------|--|----------|
| RAS-10SKX-1 RAS-10SK-E-1 | 4 | 15m ($l_1 + l_2$) 15m ($l_3 + l_4$) | 8m ($l_1 - l_2$) 8m ($l_3 - l_4$) | 5m | 1m | Fig. 5-1 |

5-1-2. Piping Material and Sizes

Table 5-2

| Piping material | Model | Piping size (mm) | |
|---|-----------------------------|------------------|---------|
| | | Larger | Smaller |
| Phosphate deoxidized copper seamless pipes for air conditioners | RAS-10SKX-1 RAS-10SK-E-1 | 9,5 | 6,4 |

5-1-3. Air Purging

- Subject the refrigerant tube of outdoor and indoor units to air purge with a vacuum pump.
- Do not carry out this air purge by using the refrigerant filled in the outdoor unit.
- To handle valves, a 5mm hexagon wrench is needed.

5-1-4. Refrigerant Pipe Connecting Position

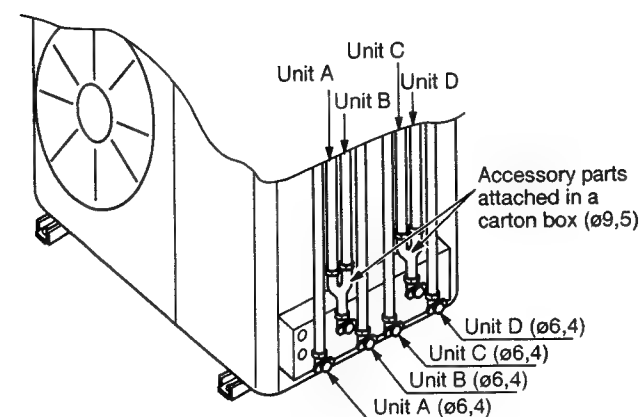


Fig. 5-2

5-1-5. Additional Refrigerant Quantities

Table 5-3

| Model | Addition per meter |
|----------------------------|--------------------|
| RAV-4M241A RAV-4M241A-E | No need |

6. UNIT INSTALLATION

Service Space

Ensure that there is sufficient space around the outdoor unit for installation and servicing.

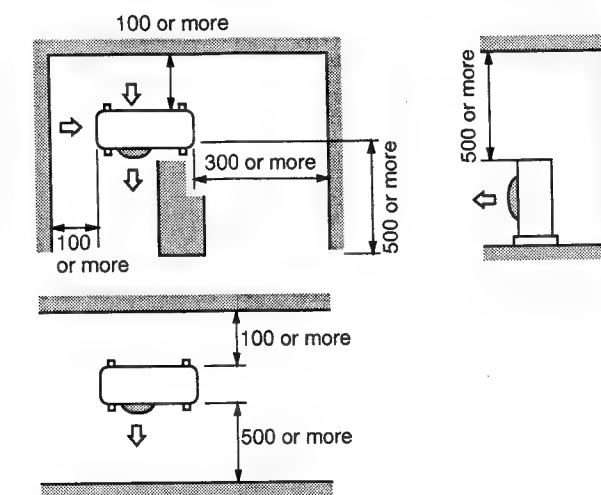


Fig. 6-1

- Do not install in a place that can increase the vibration and amplify the noise level of the units.
- Be sure to fix the outdoor unit with four (4) M10 anchor bolts according to foundation drawings below.

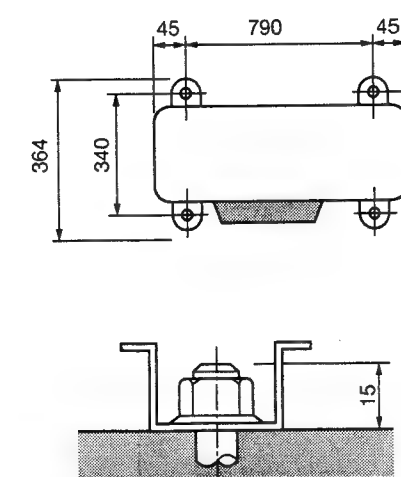


Fig. 6-2

7. OPERATIONAL MATRIX OF ELECTRICAL PARTS

| Operating Indoor unit | | | | Parts | | | | Indoor unit P.C. board relay | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|---|-------|----|----|----|------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|------|------|------|------|------|------|---|--------------|---|--------------|
| | | | | RY | RY | RY | RY | CM | CM | FM | 52 | 52 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 20SR | 20SR | 20SR | 20SR | 20SR | 20SR | T | T1 | T | T2 |
| | | | | 7A | 7B | 7C | 7D | 1 | 2 | | C1 | C2 | A1 | C1 | D1 | E1 | A2 | B2 | C2 | D2 | E2 | A1 | B1 | C1 | A2 | B2 | C2 | 1 | Con- tact | 2 | Con- tact |
| Outdoor unit power ON Indoor unit not operating | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | X | O | X | X | X | O | X | O | |
| A | | | | O | X | X | X | O | X | O | O | X | O | O | X | X | X | X | X | O | X | X | O | X | X | X | O | X | O | | |
| | B | | | X | O | X | X | O | X | O | O | X | X | X | O | O | X | X | X | X | X | O | X | O | X | X | X | O | X | O | |
| | | C | | X | X | O | X | X | O | O | X | O | X | X | X | O | X | X | O | O | O | X | X | O | X | X | X | O | X | O | |
| | | | D | X | X | X | O | X | O | O | X | O | X | X | X | X | O | X | O | O | O | X | X | X | O | X | X | O | X | O | |
| A (Thermostat OFF before 210sec.) | | | | X | X | X | X | X | X | X | X | X | O | X | O | X | X | X | X | X | O | X | X | O | X | X | O | O | X | O | |
| A (Thermostat OFF after 210sec.) | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | X | O | X | X | X | X | X | O | |
| B (Thermostat OFF before 210sec.) | | | | X | X | X | X | X | X | X | X | X | O | X | O | X | X | X | X | X | O | X | X | O | X | X | O | O | X | O | |
| B (Thermostat OFF after 210sec.) | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | X | O | X | X | X | O | X | O | |
| C (Thermostat OFF before 210sec.) | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | O | O | X | X | O | X | X | X | O | O | O | |
| C (Thermostat OFF after 210sec.) | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | X | O | X | X | X | O | X | X | |
| D (Thermostat OFF before 210sec.) | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | O | O | X | X | O | X | X | X | O | O | O | |
| D (Thermostat OFF after 210sec.) | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | X | O | X | X | X | O | X | X | |
| A Thermo OFF/B ON (before 210sec.) | | | | X | O | X | X | X | X | X | X | X | O | X | O | X | X | X | X | X | O | O | X | O | X | X | O | O | X | X | |
| B Thermo OFF/A ON (before 210sec.) | | | | O | X | X | X | X | X | X | X | O | O | X | O | X | X | X | X | X | O | X | X | O | X | X | O | O | X | X | |
| C Thermo OFF/D ON (before 210sec.) | | | | X | X | X | O | X | X | X | X | X | X | X | X | O | O | X | O | O | O | X | X | O | O | X | X | X | O | O | |
| D Thermo OFF/C ON (before 210sec.) | | | | X | X | O | X | X | X | X | X | X | X | X | O | X | O | X | O | O | O | X | X | O | X | X | X | X | O | O | |

RY Indoor unit cooling operation relay output

CM Compressor

FM Fan motor

52C Magnetic contactor for compressor

43 Indoor unit cooling operation relay

T Thermal timer

20SR A1, 2 and B1, 2 Indoor unit changeover two-way valve solenoid coil

20SR C1, 2 Compressor two-way valve solenoid coil OFF at the time of both indoor units in a cycle in operation.

8. TROUBLESHOOTING CHART

Troubleshooting Procedures :

- Following details of "What to be prechecked first", make sure of the basic items.
- When there is no trouble corresponding to above, check in detail the faulty parts following "How to judge faulty parts by symptoms" later.

8-1. What to be Prechecked First

8-1-1. Power Supply Voltage

The power supply voltage must be from AC 198V to 264V. If the power voltage is not within this range, the air conditioner may not work normally.

8-1-2. Incorrect Cable Connection between Indoor and Outdoor Units

The indoor unit is connected to the outdoor unit with three cables.

Make certain that the terminals of indoor and outdoor connectors have been connected properly by the same numbers.

If not connected as specified, the outdoor unit won't operate normally.

8-1-3. Operations not Regarded as Failure (Program operation)

In terms of the control of air-conditioner, the operations shown in Table 8-1 are made as a program operation incorporated in a microcomputer.

If a claim is made about the operation, check it corresponds to the contents in the table.

If it does, it is an indispensable operation for the control and maintenance of the air-conditioner but not a failure of the units.

- **Operations which are not Deemed Trouble**

Table 8-1

| Operation of air-conditioner | Description |
|--|---|
| When the POWER plug of the indoor unit is inserted, the OPERATION lamp blinks. | The OPERATION lamp blinks, indicating that power is turned on. If this happens, press the START/STOP button once, and blink will stop. Power failure also causes the same lamp to blink. |
| Room temperature is in the range under which the compressor is turned on, but the compressor will not start. | The compressor will not start while the compressor restart prevention timer (three-minute timer) is actuated. This applies also when power is turned on. |
| Fan speed remains unchanged when the fan speed button is operated in the dry operation. | Fan speed is fixed at Low in the dry operation. |
| Room temperature is in the range under which the compressor is turned off, but the compressor will not stop. | The compressor will not stop while the compressor on-hold timer (two-minute timer) is actuated. |
| The compressor will not switch on or off even when the thermostat control is operated in the dry operation. | In the dry operation, the compressor goes on and off at regular intervals, independent of the thermostat control. |

8-2. Primary Judgement of Trouble Sources

8-2-1. Role of Indoor Unit Controller

The indoor unit controller receives the operation commands from the remote control and assumes the following functions.

- Measurement of the draft air temperature of the indoor heat exchanger by using the temperature sensor (TA).
- Louver motor control
- Control of the indoor fan motor operation
- Control of the LED display
- Control of the outdoor unit compressor and the outdoor fan motor.

8-2-2. Display of Abnormalities and Judgement of the Abnormal Spots

The indoor unit of this machine observes the operation condition of the air conditioner and displays the contents of the self-diagnosis as block displays on the display panel of the indoor unit.

Table 8-2

| Block display | Check code | Self-diagnosis | Check code |
|---|------------|---|------------|
| OPERATION display blinking (1 Hz) | — | Power failure (When power is on) | — |
| OPERATION display blinking (5 Hz) | 00 | Temperature sensor (TA) short/break | 00 |
| OPERATION display blinking (5 Hz) | 00 | Heat exchanger sensor (TC) short/break | 08 |
| OPERATION display blinking (5 Hz) | 00 | Indoor fan lock, abnormality of indoor fan, IC03, D15 short/break | 11 |
| OPERATION display blinking (5 Hz) | 00 | Indoor P.C. board failure | 12 |
| OPERATION and TIMER display blinking (5 Hz) | 01 | Thermal fuse is blown (Indoor fan motor is overheat) | 04 |
| OPERATION, TIMER and FAN ONLY display blinking (5 Hz) | 03 | <ul style="list-style-type: none"> • Gas shortage, other refrigerant cycle trouble • Heat exchanger sensor open/short/break • Overload relay trouble | 09 |
| OPERATION, TIMER and FAN ONLY display blinking (5 Hz) | 03 | Compressor trouble | 18 |

(1) Judgement from defective operation or abnormal operation

Table 8-3

| System | Check | | Primary judgement |
|---|--|---------------------------------|--|
| No reaction on remote control operation | Turn off the power once, turn it on again and try to operate the remote control again. | Remote control is not possible. | The indoor part (including the remote control) is defective. |
| | | Remote control is possible. | OK |
| The outdoor fan does not rotate | The compressor operates. | | The outdoor part is defective. (outdoor fan motor) |
| | The compressor does not operate. | | The inside part is defective. |

(2) Self-diagnosis with remote control

With the indoor unit control, self-diagnosis of protective circuit action can be done by turning the remote control operation into service mode, operating the remote control, observing the remote control indicators and checking whether OPERATION lamp blinks (5 Hz).

Note :

- To perform this self-diagnosis, the remote control with the service code of 43069666 is required.

<How to select remote control operation mode>

1) Selecting service mode

Push the switch button provided on rear bottom of the wireless remote control with a tip of pencil for more than 3 seconds.

Make sure the setting temperature "00" is displayed on the display and other display is turned off.

2) Selecting ordinary mode

Push the all clear button (ACL) on the rear bottom of the wireless remote control by a tip of pencil for more than 3 seconds.

Make sure the operation mode display, wind volume display, clock display and setting temperature display are turned on and " : " of the clock display is blinking.

<Cautions when doing service>

- 1) After completion of servicing, always push the all clear (ACL) button to return the operation mode to the normal mode.
- 2) After completion of servicing by the check code, turn off the power once and then turn on the power to reset memorized contents of the microcomputer to the initial status.

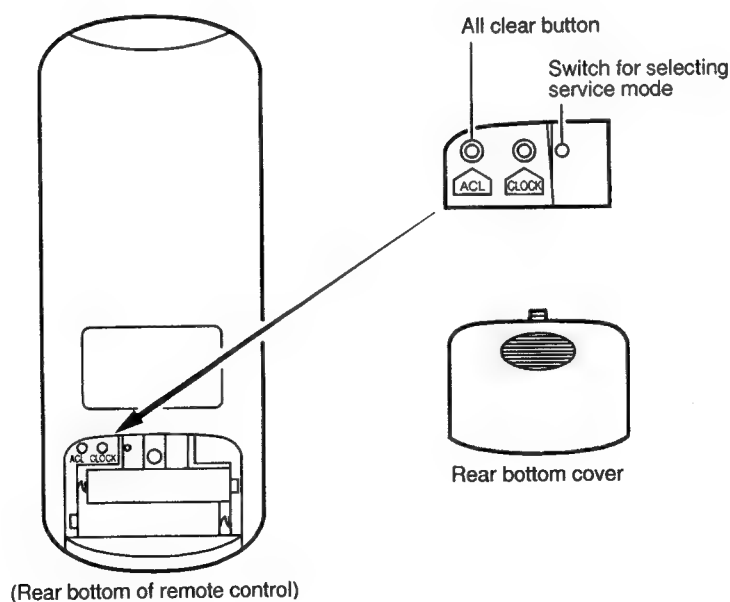




Fig. 8-1

<Self-diagnosis by check codes>

- 1) The self-diagnosis by the check codes is conducted under the block displays of item b)-e).

- 2) Remote control key operation under the service mode is conducted by ON/OFF or TEMP. The remote control display by each key operation is varied as shown below.
Two digit number is displayed in a hexadecimal number.

Table 8-4

| Operating key | Indication after operation |
|---|---|
| ON/OFF | "00" |
| TEMP.  (Up) | 1 is added to data before operation. (Example) "02" → "03" |
| TEMP.  (Down) | 1 is subtracted from data before operation. (Example) "02" → "01" |
| "AUTO" LOUVER | 10 is subtracted from data before operation. (Example) "02" → "12" |
| "SET" LOUVER | Data before operation is directly transferred. (Example) "02" → "02" |


- 3) The self-diagnosis by the check codes is conducted with procedures shown below.

- Enter the service mode and make sure the off timer display of the remote control shows "00".
- Operate the "ON/OFF" key and make sure the timer lamp on the display section is blinking (5Hz).
- At the same time, also make sure the OPERATION lamp is also blinking.

This shows that the protection circuit on the indoor P.C. board is working.

- d) Operate the TEMP.  key and make sure the remote control display shows "01" and blinking of the OPERATION lamp.

If the operation lamp is blinking, it shows the protection circuits for connecting cable is working or thermal fuse is blown.

- e) In the same way, operate the TEMP.  key so that the display is increased one by one to continue checks by the self-diagnosis as shown in the next table.

From "00" up to "03" check operations of protection circuits for each block, and "04" to "1F" check operations of the typical protection circuits.

Table 8-5

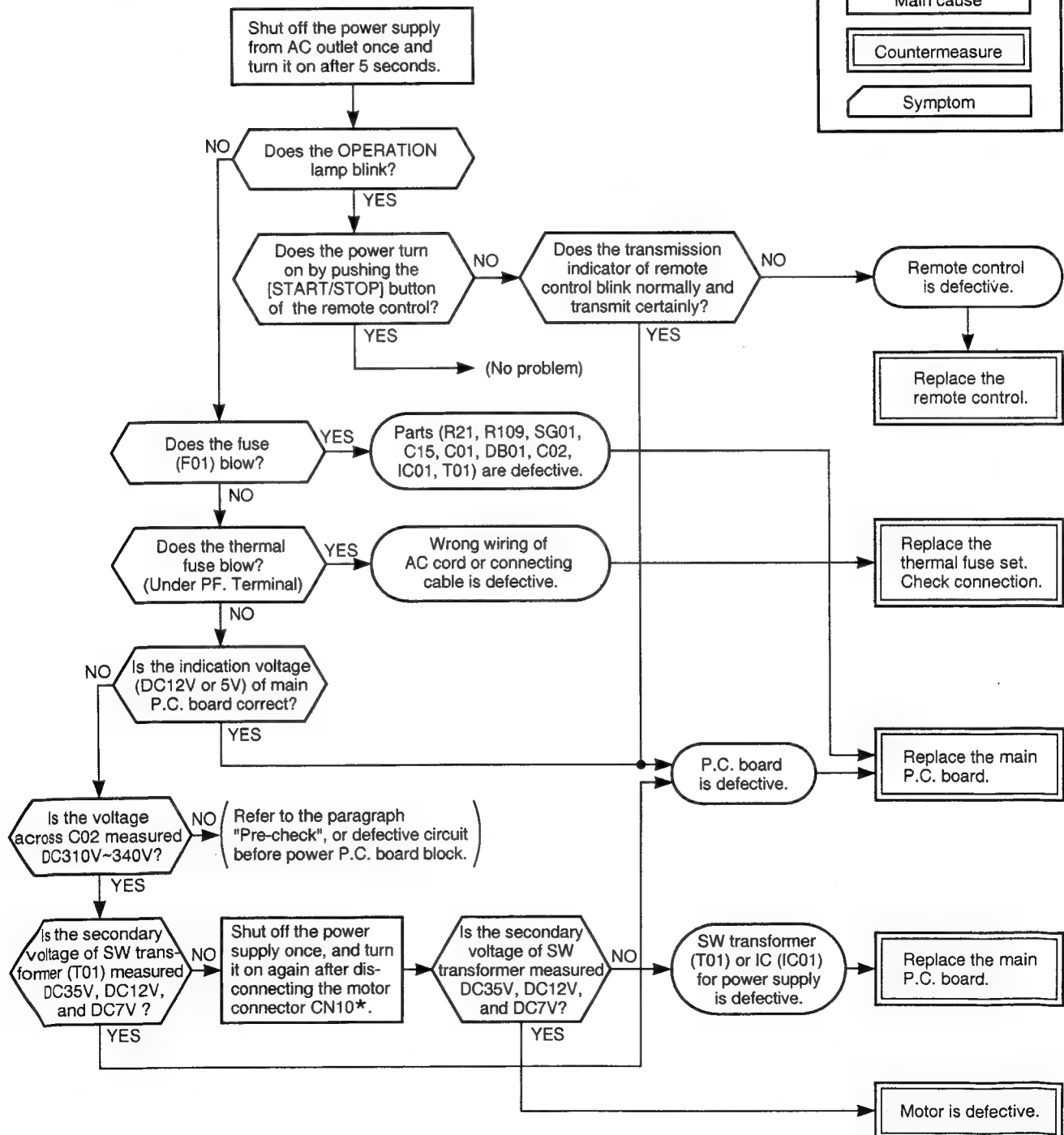
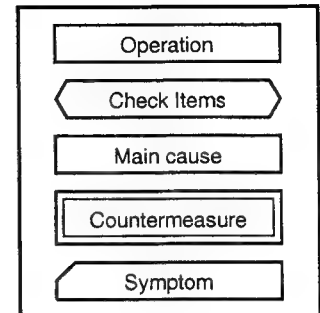
| Block level | | Diagnosis function | | | | Judgment and action |
|-------------|--------------------------------|--------------------|---|------------------------|----------------------------------|---|
| Check code | Block | Check code | Symptom | Air conditioner status | Condition | |
| 00 | Indoor P.C. board | 01 | Thermo sensor short/break | Continued operation | Indicated when detected abnormal | <ul style="list-style-type: none"> • Check thermo sensor. • If it is OK, check P.C. board. (Around sensor circuit) |
| | | 02 | Heat exchanger sensor short/break | Continued operation | Indicated when detected abnormal | <ul style="list-style-type: none"> • Check heat exchanger sensor. • If it is OK, check P.C. board. (Around sensor circuit) |
| | | 11 | Indoor fan lock, abnormality of indoor fan | All off | Indicated when detected abnormal | <ul style="list-style-type: none"> • Check motor. • Replace P.C. board, if the same failure occurs, after the motor check. |
| | | 12 | Abnormality of other indoor unit P.C. board | Continued operation | Indicated when detected abnormal | Replace P.C. board. |
| 01 | Cable connection/ Thermal fuse | 04 | Wrong wiring or disconnection of connective cable | All off | Indicated when detected abnormal | <ul style="list-style-type: none"> • Check flat cable correct if wiring is wrong. • If it is OK, check P.C. board. |
| | | | <ul style="list-style-type: none"> • Thermal fuse cut off • Indoor fan lock, abnormality of indoor fan | All off | Indicated when detected abnormal | <ul style="list-style-type: none"> • Check thermal fuse. • If it is OK, check motor. • If motor is OK, check P.C. board. |
| 03 | Refrigerant system | 09 | <ul style="list-style-type: none"> • Gas shortage (Gas leak) • Other refrigerant cycle trouble • Heat exchanger sensor off/break/short • Overload relay break | All off | Indicated when detected abnormal | <ul style="list-style-type: none"> • Check gas quantity. (Check gas leakage) • If it is OK, check heat exchanger sensor. • If heat exchanger sensor is OK, check overload relay. • If overload relay is OK, check refrigerant cycle. • If refrigerant cycle is OK, check P.C. board. |
| | | 12 | Compressor break down | All off | Indicated when detected abnormal | <ul style="list-style-type: none"> • Check compressor. • If it is OK, check P.C. board. |

8-3. Troubleshooting Flowcharts

8-3-1. Power can not be Turned on (No Operation at All)

<Preliminary checks>

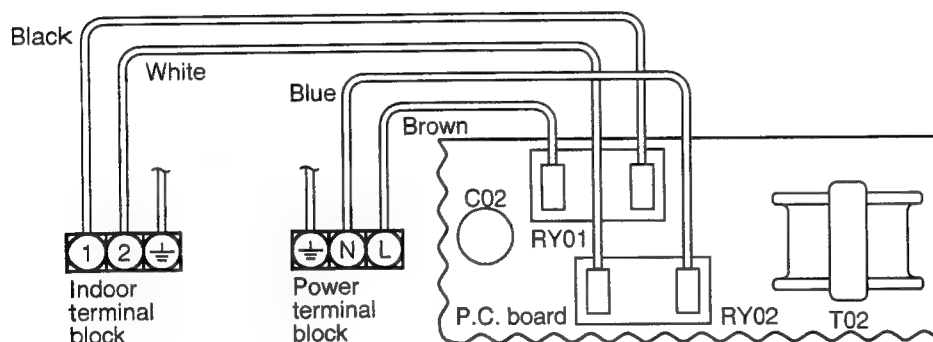
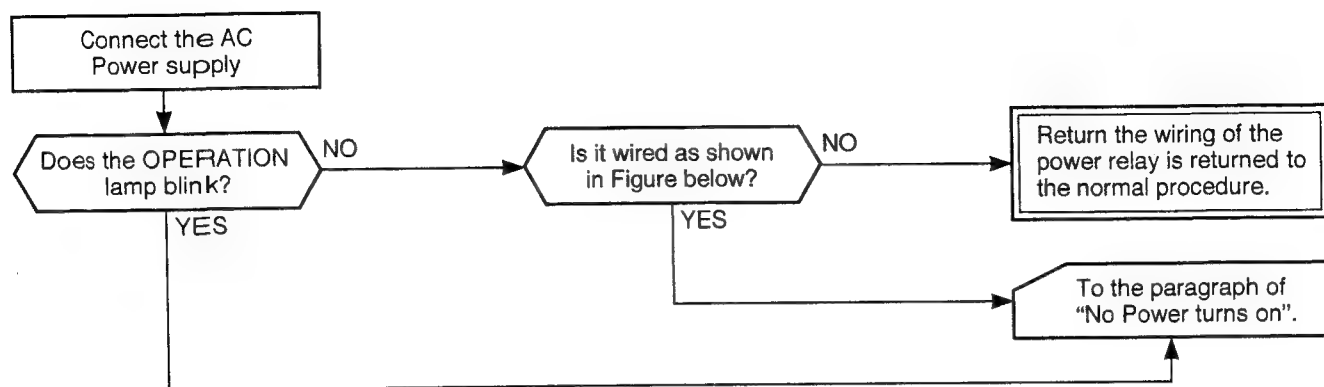
- (1) Is the supply voltage normal?
- (2) Is the connection to the AC output OK?



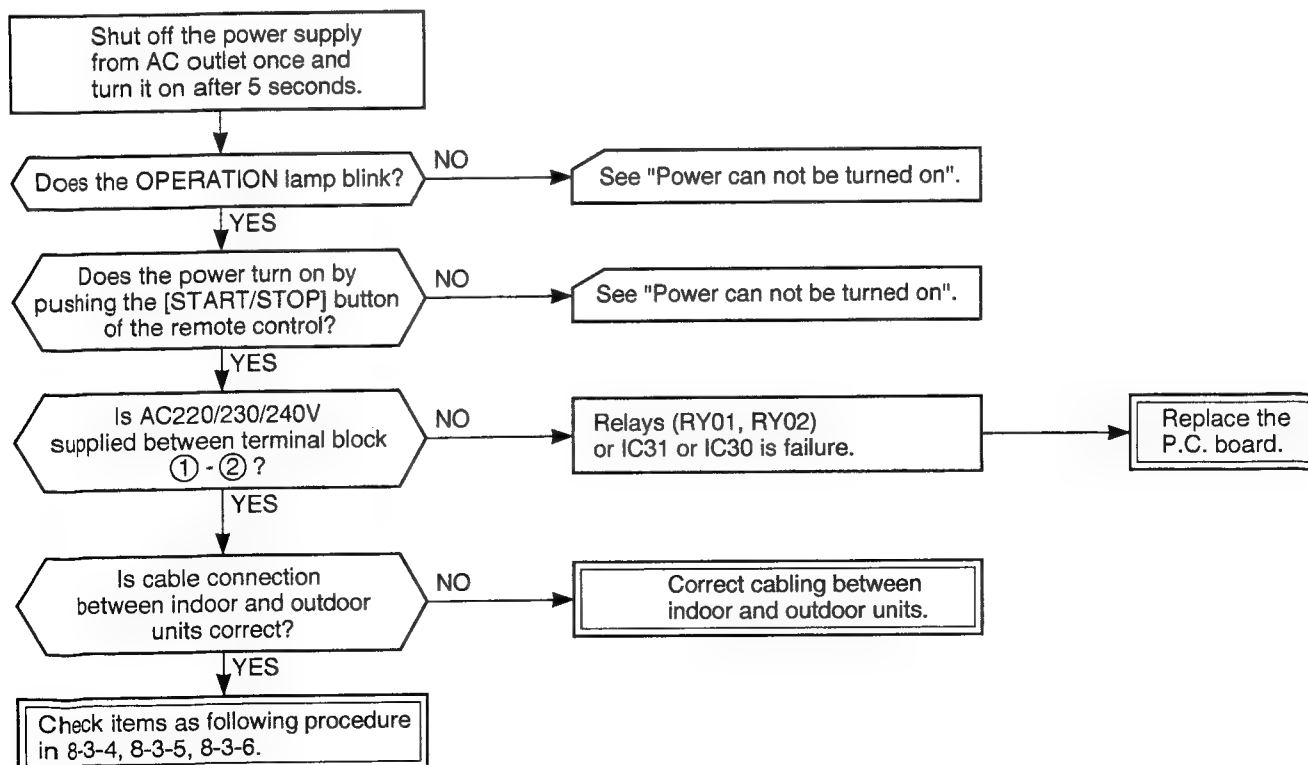
* Be sure to disconnect the motor connector CN10 after shut off the power supply, or it will be a cause of damage of the motor.

8-3-2. Power can not be Turned on after Replacing Indoor P.C. Board

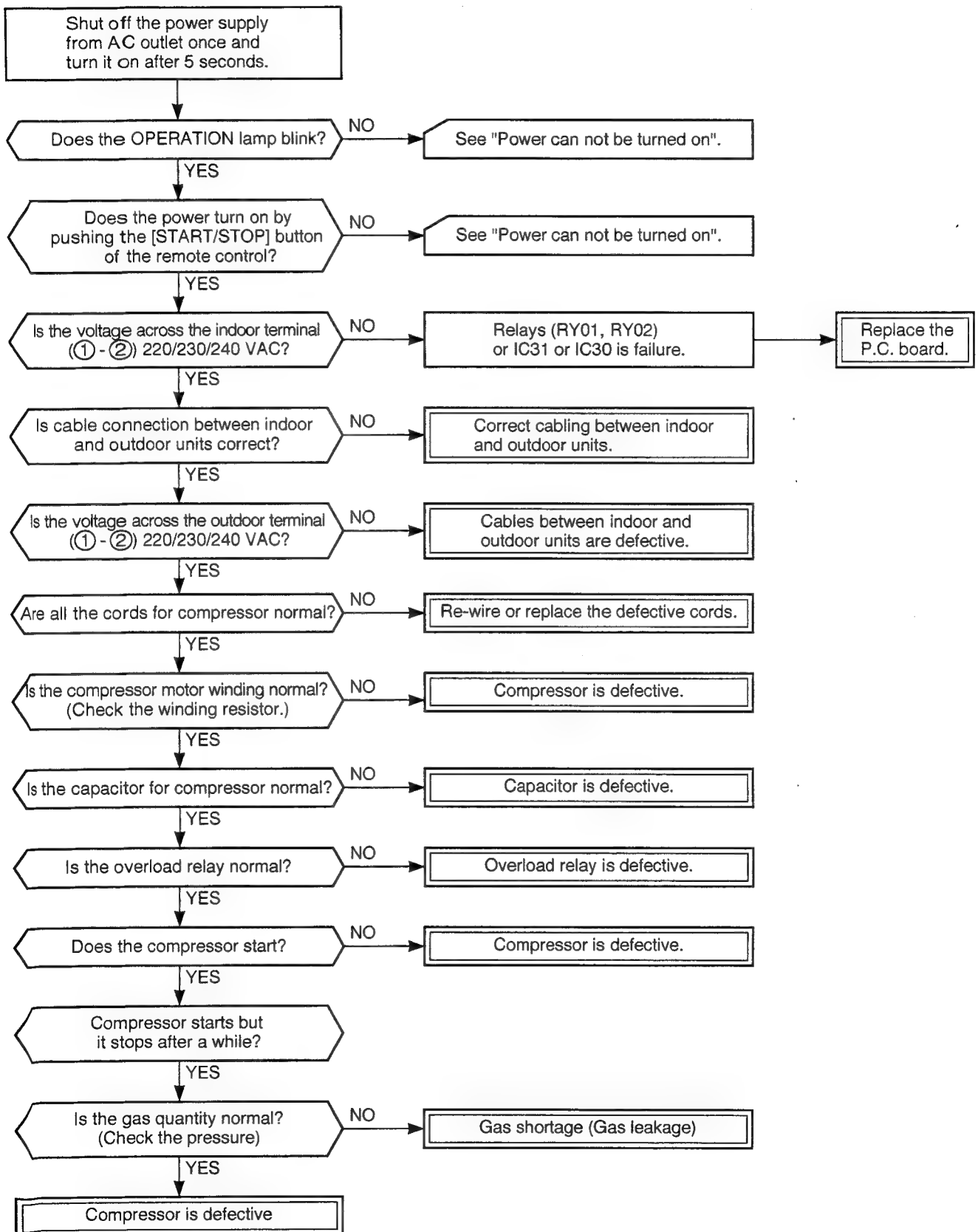
<Checking Procedure>



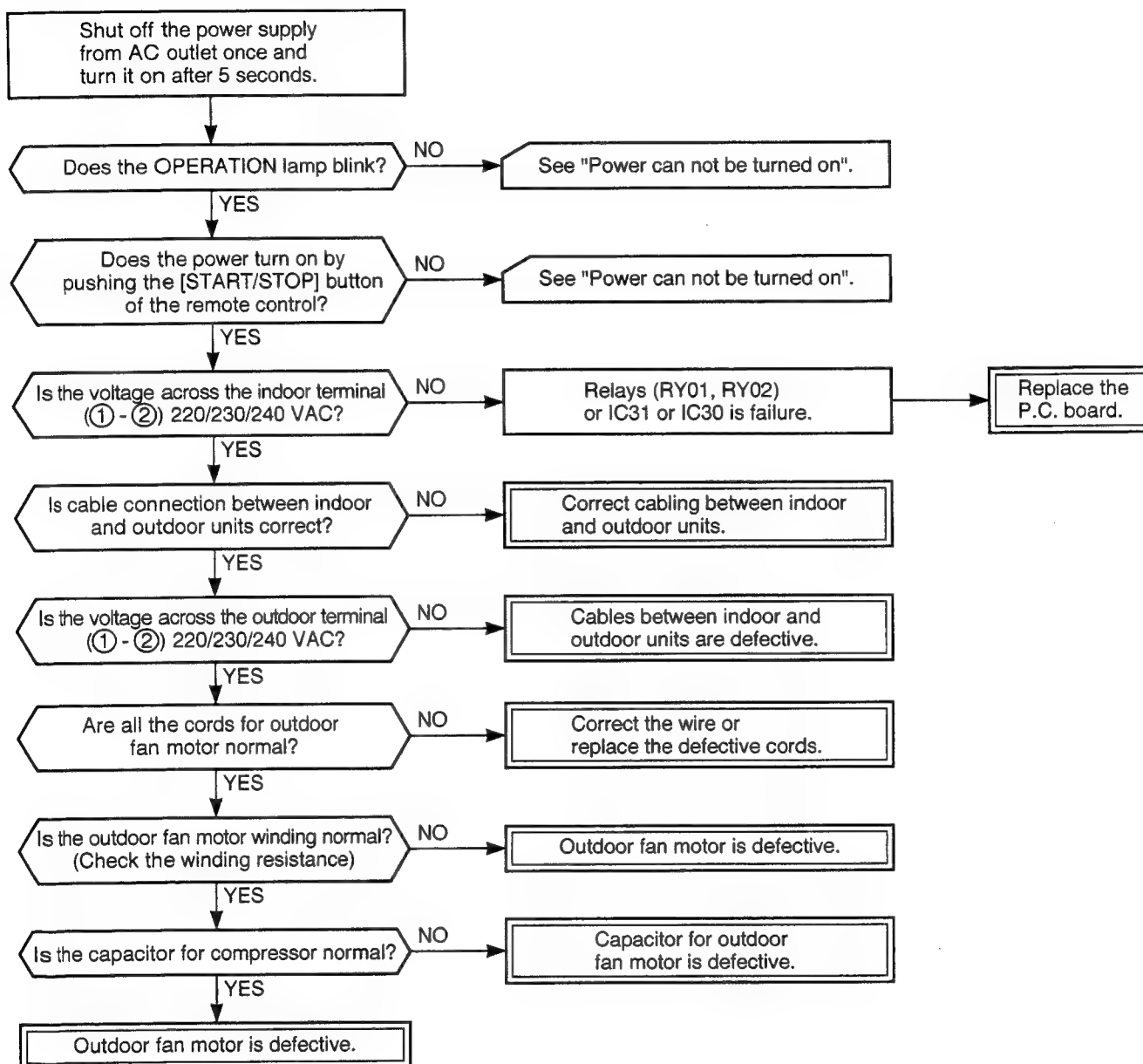
8-3-3. Outdoor Unit does not Operate



8-3-4. Only Compressor does not Operate

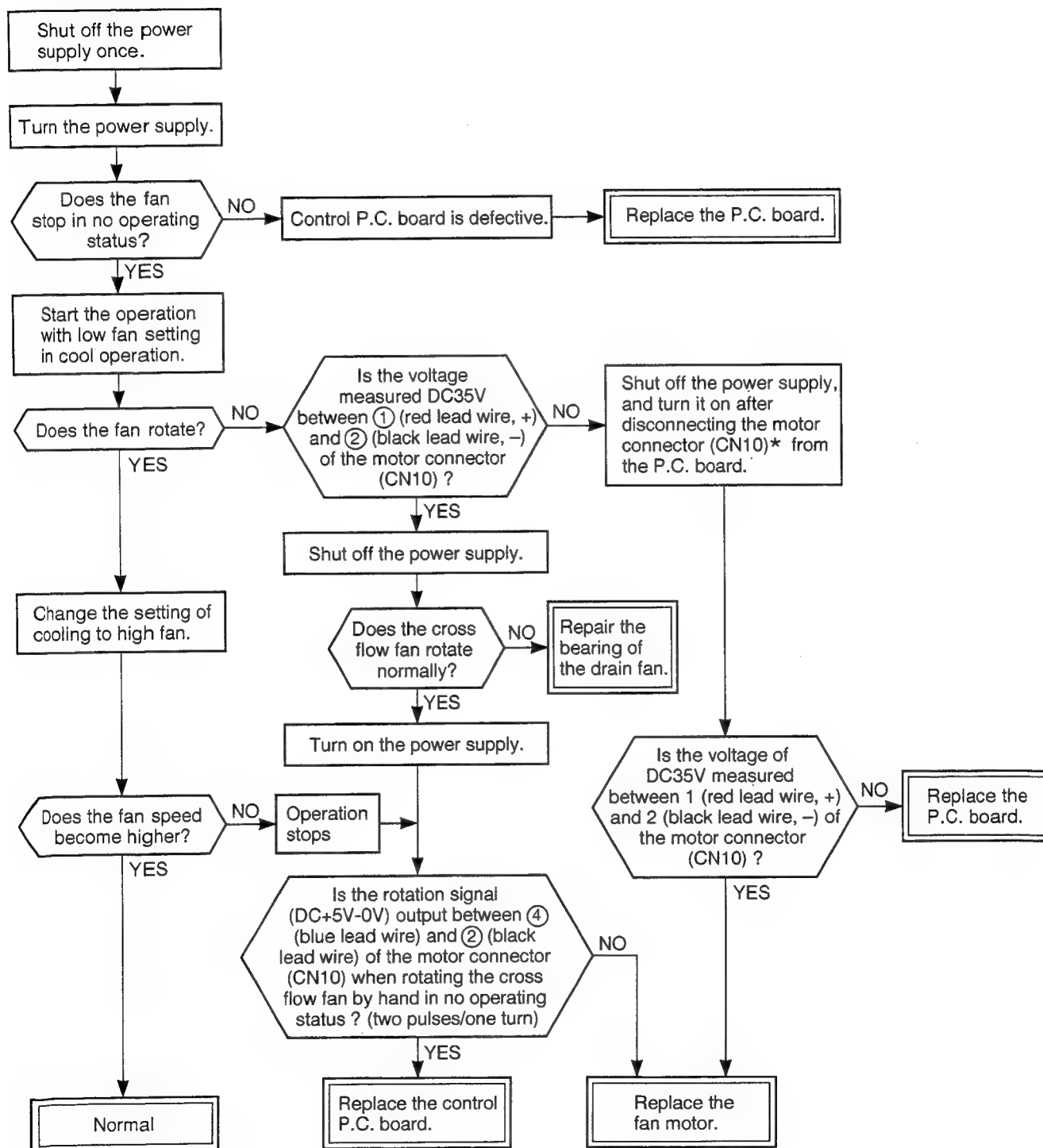


8-3-5. Only Outdoor Fan does not Operate



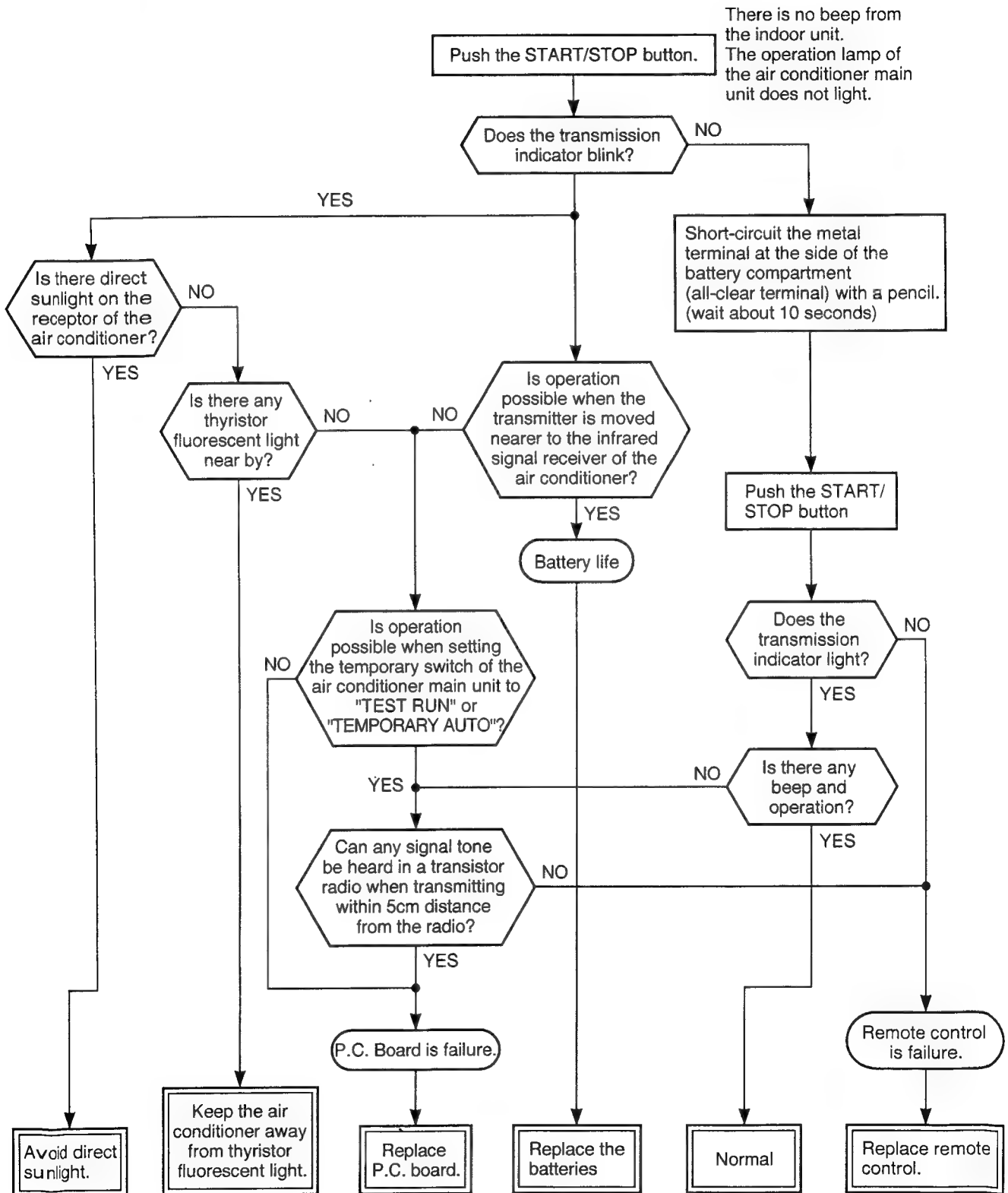
8-3-6. Only the Indoor Fan does not Operate

< Check procedure >



* Be sure to disconnect the motor connector CN10 after shut off the power supply, or it will be a cause of damage of the motor.

8-4. How to Check the Remote Control (Including the Indoor P.C. Board)



Note: After battery replacement, shortcircuit the metal terminal at the side of the battery compartment (all-clear terminal) with a pencil.

8-4-1. How to Check the P.C. Board

(1) Operating precautions

- 1) When removing the front panel or the P.C. board, be sure to shut off the power supply.
- 2) When removing the P.C. board, hold the edge of the P.C. board and do not apply force to the parts.
- 3) When connecting or disconnecting the connectors on the P.C. board, hold the whole housing. Do not pull at the lead wire.

(2) Inspection procedures

- 1) When a P.C. board is judged to be defective, check for disconnection, burning, or discoloration of the copper foil pattern or this P.C. board.
- 2) The P.C. board consists of the following two parts

a. Main P.C. board part:

Power relay, indoor fan motor drive circuit and control circuit, C.P.U. and peripheral circuits, buzzer drive circuit and buzzer.

b. Infrared rays receive and indication parts:

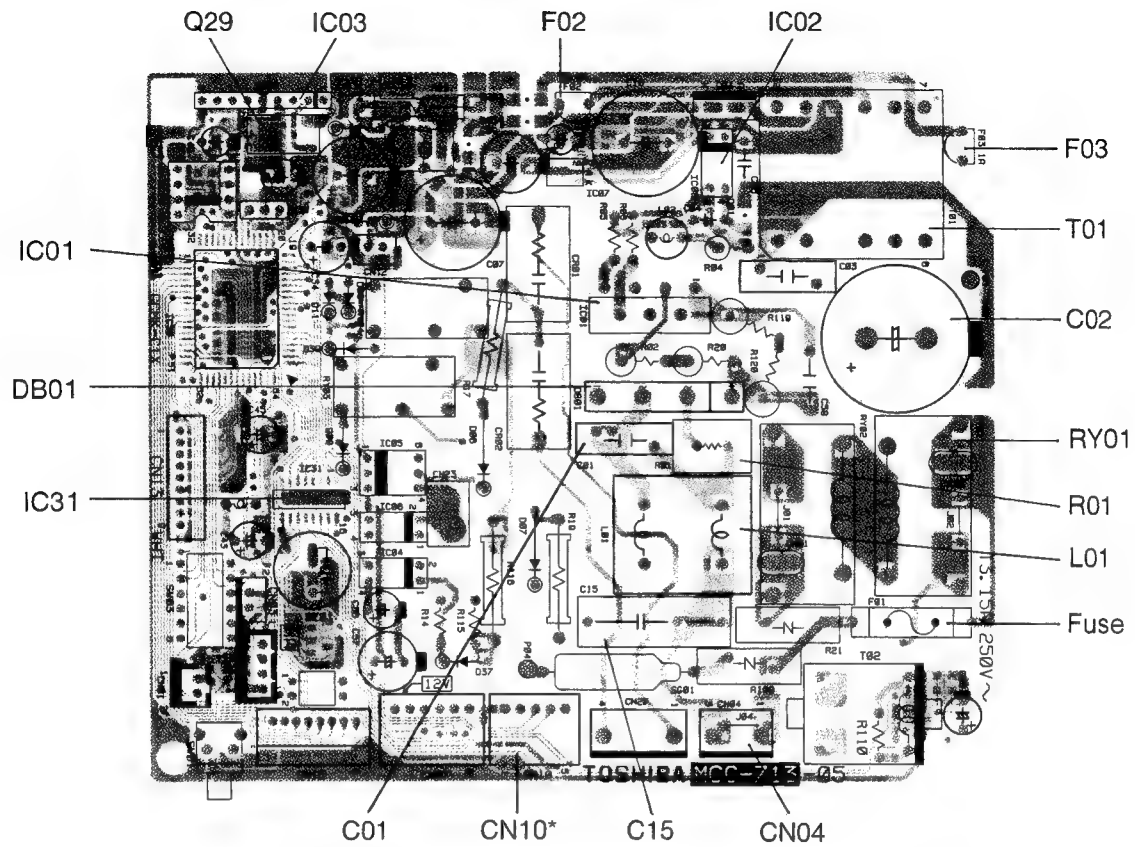
Infrared rays receive unit and LED.

(3) Checking procedure

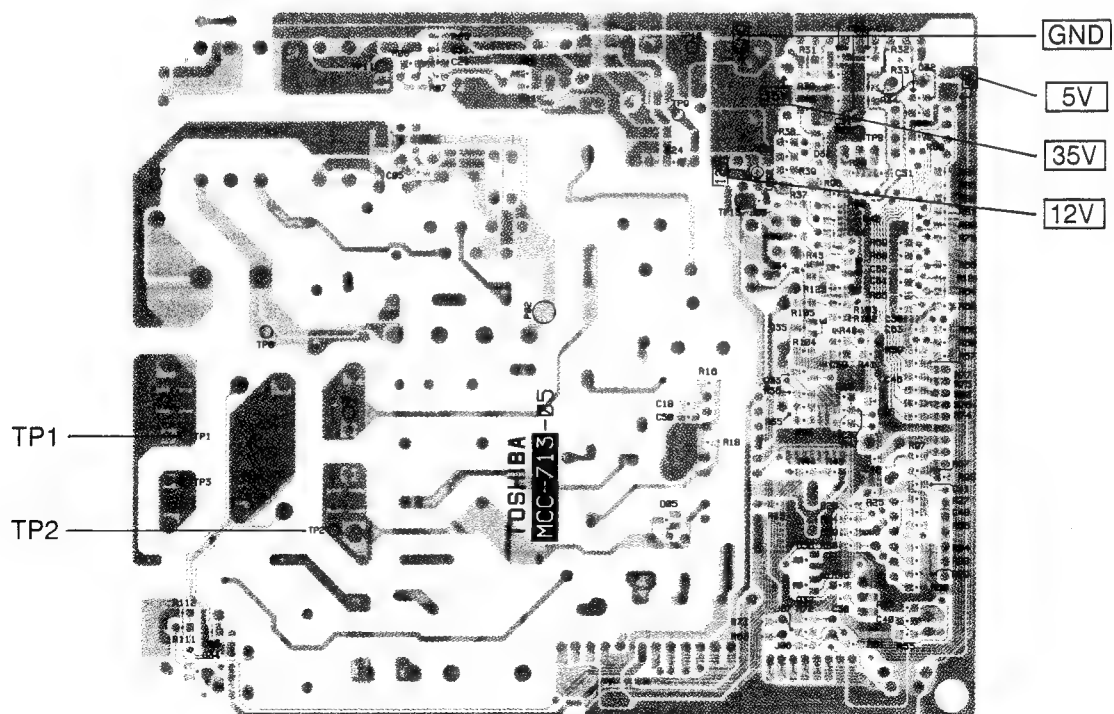
Table 8-6

| No. | Procedure | Check Point (Symptom) | Causes |
|-----|---|---|--|
| 1 | Shut off the power supply and remove the P.C. board assembly from the electronic parts base. Remove the connecting cable from the terminal block. | 1. Is the fuse blown? | 1. * Application of shock voltage. * Over-current by short-circuit of the parts. |
| 2 | Remove the connector for the motor, and turn the power on. If the OPERATION lamp blinks (0,5 sec. :ON, 0,5 sec. :OFF) when the power turning on, the checking points described as 1-5 of right column are not necessary to perform. | Voltage check 1. Between TP1 and TP2 (220/230/240V AC) 2. Between TP2 and pin 1 of CN04 (220/230/240V AC) 3. Between TP2 and pin 3 of CN04 (220/230/240V AC) 4. Between + and - of C02 (310 ~ 340V DC) 5. Between 35V and GND 6. Between 12V and GND 7. Between 5V and GND | 1. * AC power cord is defective. * Poor contact of the terminal plate. * Miss wiring of the power relay. 2. Fuse is defective. 3. Operation of the thermal fuse. 4. * Capacitor (C01, C15) is defective. * Line filter (L01) is defective. * Resistor (R01) is defective. * Diode (DB01) is defective. 5. IC01, IC02, T01 are defective. 6. IC01, IC02, T01, F03 are defective. 7. IC01, IC02, T01, F02, Q29, IC03 are defective. |
| 3 | Make the operation status by pushing once the START/STOP button, except the status of [FAN ONLY], [ON TIMER]. | Voltage check 1. Voltage of relay coil. (DC 12V) Between pin 10 of IC31 and GND Between pin 11 of IC31 and GND 2. Between No. 1 and 2 of connecting cable terminal block. (220/230/240V AC) | 1. Breaking wire of the relay coil, defective relay driver. (IC31) 2. Poor contact of relay. |
| 4 | Start the operation with the system which the time of the restart delay timer is shortened. | 1. All indicators light for 3 sec. 2. Indicators do not indicate normally after approximate 3 sec. | } Defective indicator, or poor housing assembly. (CN13) |
| 5 | Make the operation status by pressing once the START/STOP button. 1. The time of the restart delay timer is shortened. 2. Cool operation 3. Air volume [AUTO] 4. Make the setting temperature lower enough than room temperature. 5. Continuous operation. | 1. Compressor does not operate. 2. OPERATION lamp blinks. | 1. The temperature of the indoor heat exchanger is abnormally lower. 2. Poor contact of the heat exchanger sensor. (The connector is disconnected.) (CN01) 3. Heat exchanger sensor, main P.C. board are defective. (Refer to Table 8-7 for the judgment of defective resistance values.) 4. Main P.C. board is defective. |
| 6 | The status of No. 5 is continued, and make the following condition. 1. Heat operation 2. Make the setting temperature higher enough than room temperature. | 1. Compressor does not operate. 2. OPERATION lamp blinks. | 1. The temperature of the heat exchanger is abnormally high. 2. The heat exchanger sensor connector has short-circuit. (CN01) 3. The heat exchanger sensor is defective. (Refer to Table 8-7 for the judgment of defective resistance values.) 4. P.C. board is defective. |
| 7 | Turn the power on after connecting the motor connector. Start the operation with the following condition. 1. Operation [Cooling] 2. Airflow [High fan] 3. Continuous operation | 1. The voltage of DC 35V is not measured between the red and black of the motor terminals. 2. Motor does not rotate. (The key operation is accepted.) 3. The motor rotates, but it vibrates too much. | 1. Indoor fan motor is defective. (Protecting operation on the P.C. board.) 2. Poor contact of the motor connector. 3. P.C. board is defective. |

8-5. P.C. Board Layout



Top View



Bottom View

Table 8-7 Approximate value of the sensor (thermistor) resistance (TA, TC)

(= kΩ)

| Sensor \ Temperature | 0°C | 10°C | 20°C | 25°C | 30°C |
|-----------------------------|------------|-------------|-------------|-------------|-------------|
| Thermo. Sensor | 35,8 | 20,7 | 12,6 | 10,0 | 7,92 |

8-5-1. How to Reduce the Operation Time of the Anti-restart Timer

- Drill 2 holes on the rear of the wireless remote control unit.
- Attach the diode (1S1555 or equivalent) to the rivet inside the unit.
- Push the START/STOP button to start operation with the diode attached.

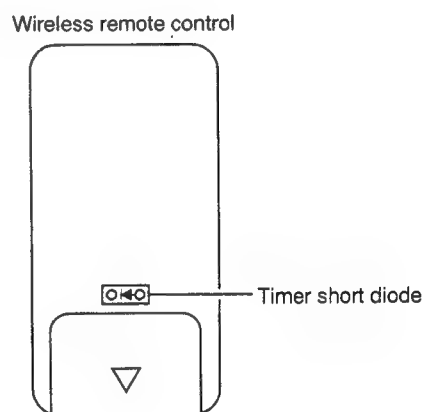
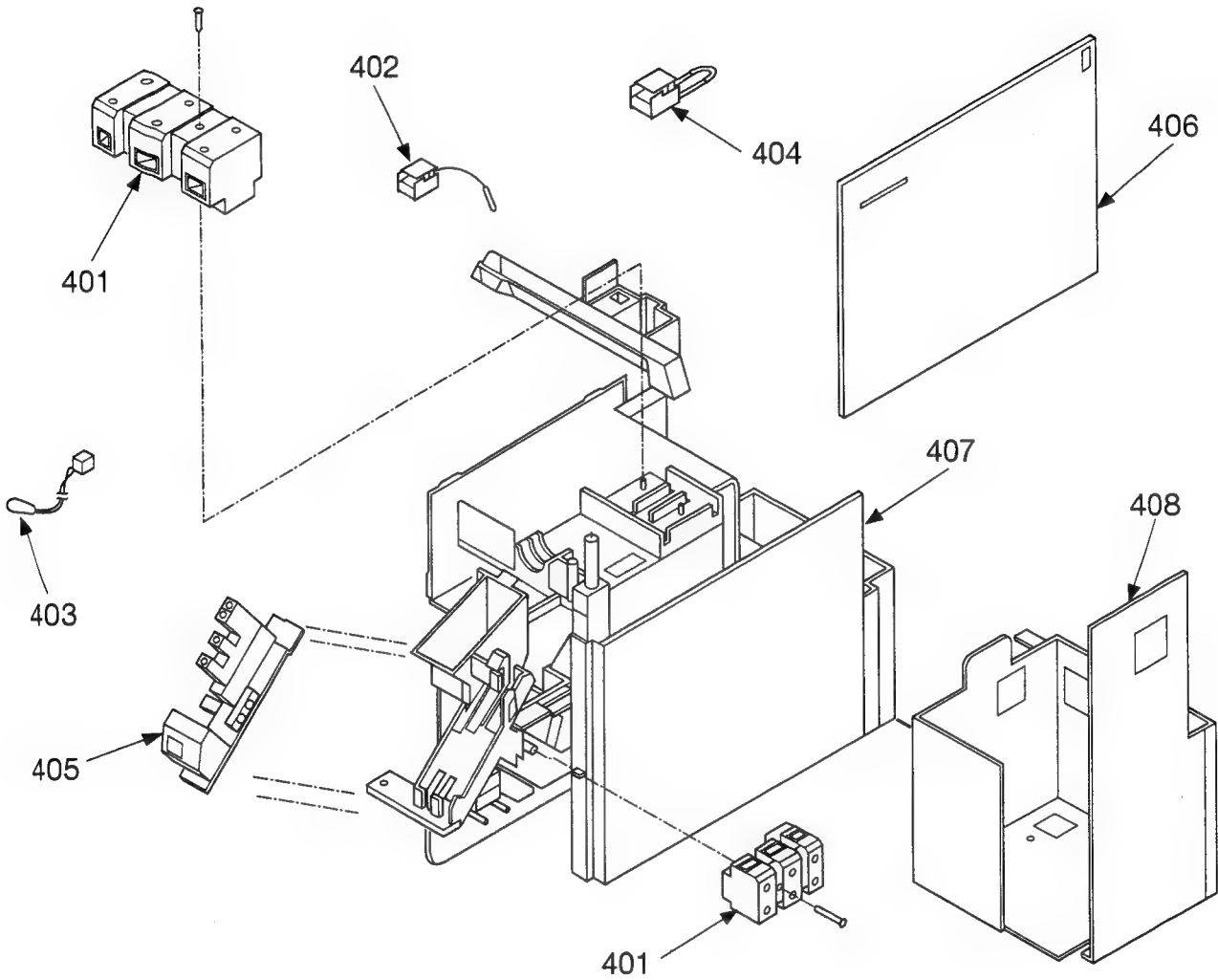


Fig. 8-2

9. EXPLODED VIEWS AND PARTS LIST

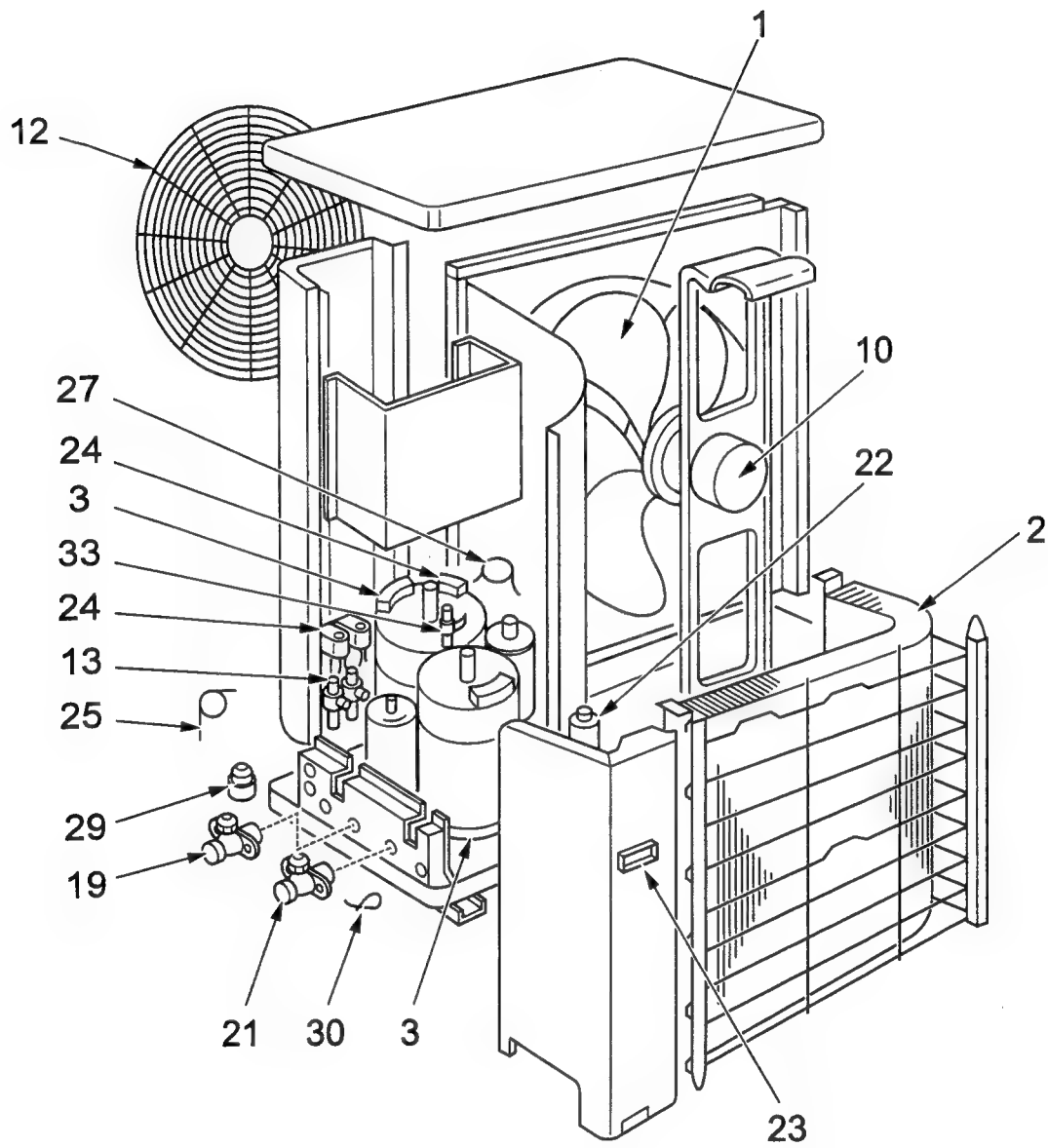
9-1. Indoor Unit

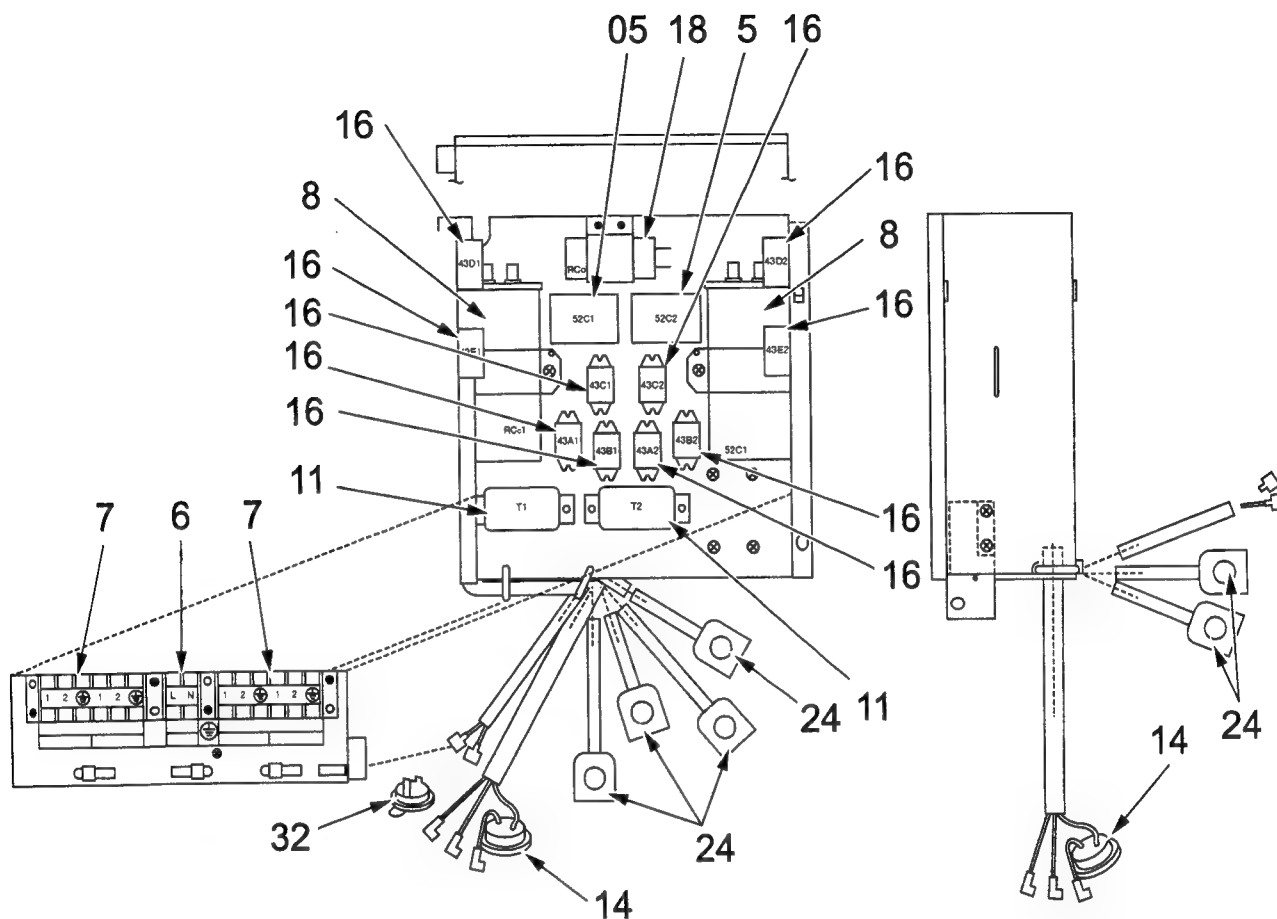


| Location No. | Part No. | Description |
|--------------|----------|--------------------------------------|
| 401 | 43T60002 | Base, Terminal 3P, AC 300V, 20A |
| 402 | 43T69004 | Sensor, Heat Exchanger 10kΩ, 25°C |
| 403 | 43T69005 | Sensor, Thermostat 10kΩ, 25°C |
| 404 | 43T60004 | Fuse, Temperature 77°C |

| Location No. | Part No. | Description |
|--------------|----------|--------------------------------------|
| 405 | 43T69007 | P.C. Board, WRS-LED MCC-635 |
| 406 | 43T69017 | P.C. Board MCC-713 |
| 407 | 43T61001 | Base, E-Parts ABS, Black, UL94-5V |
| 408 | 43T62006 | Base, Shield SGCC-Z08-LUB |

9-2. Outdoor Unit

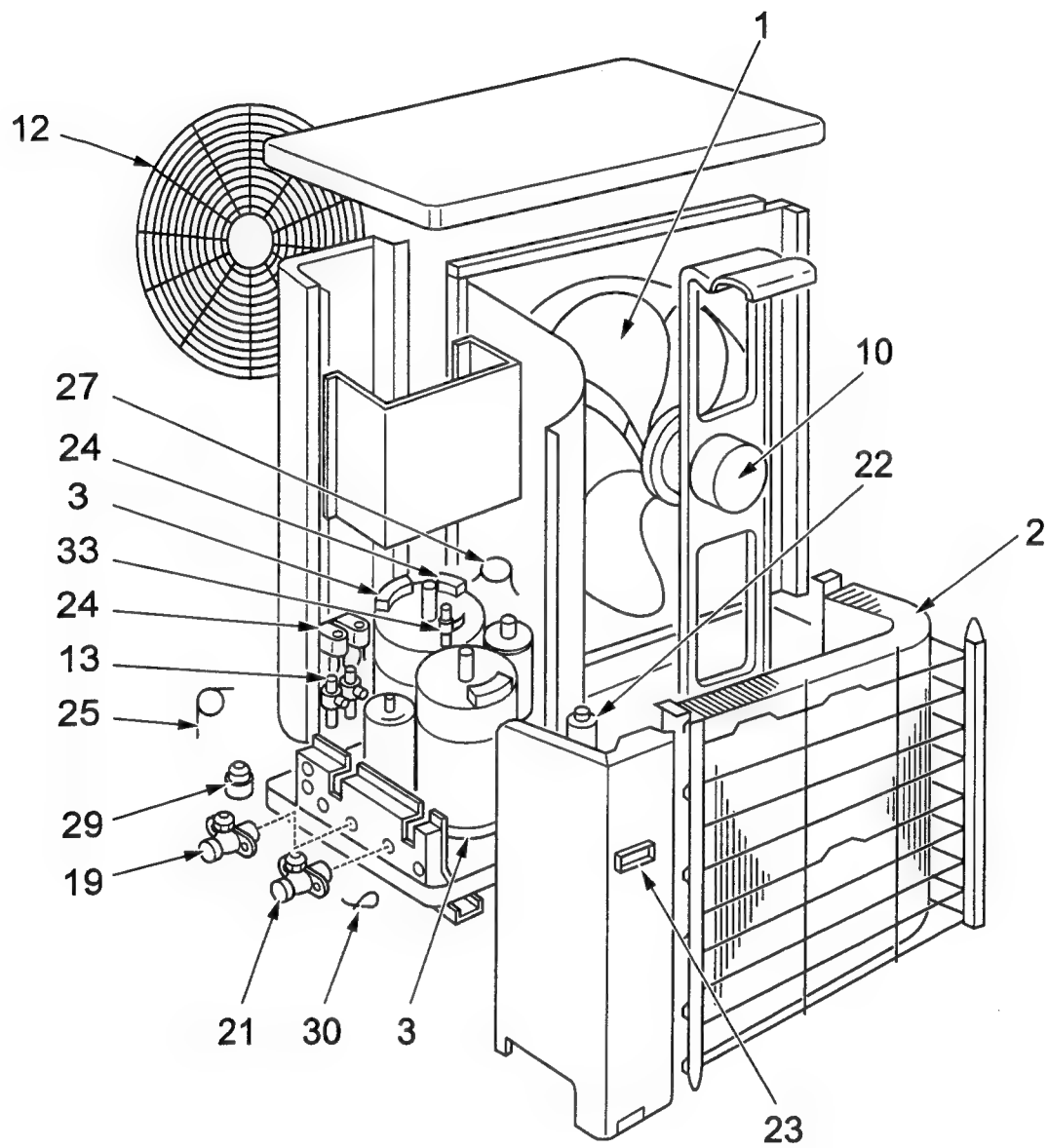


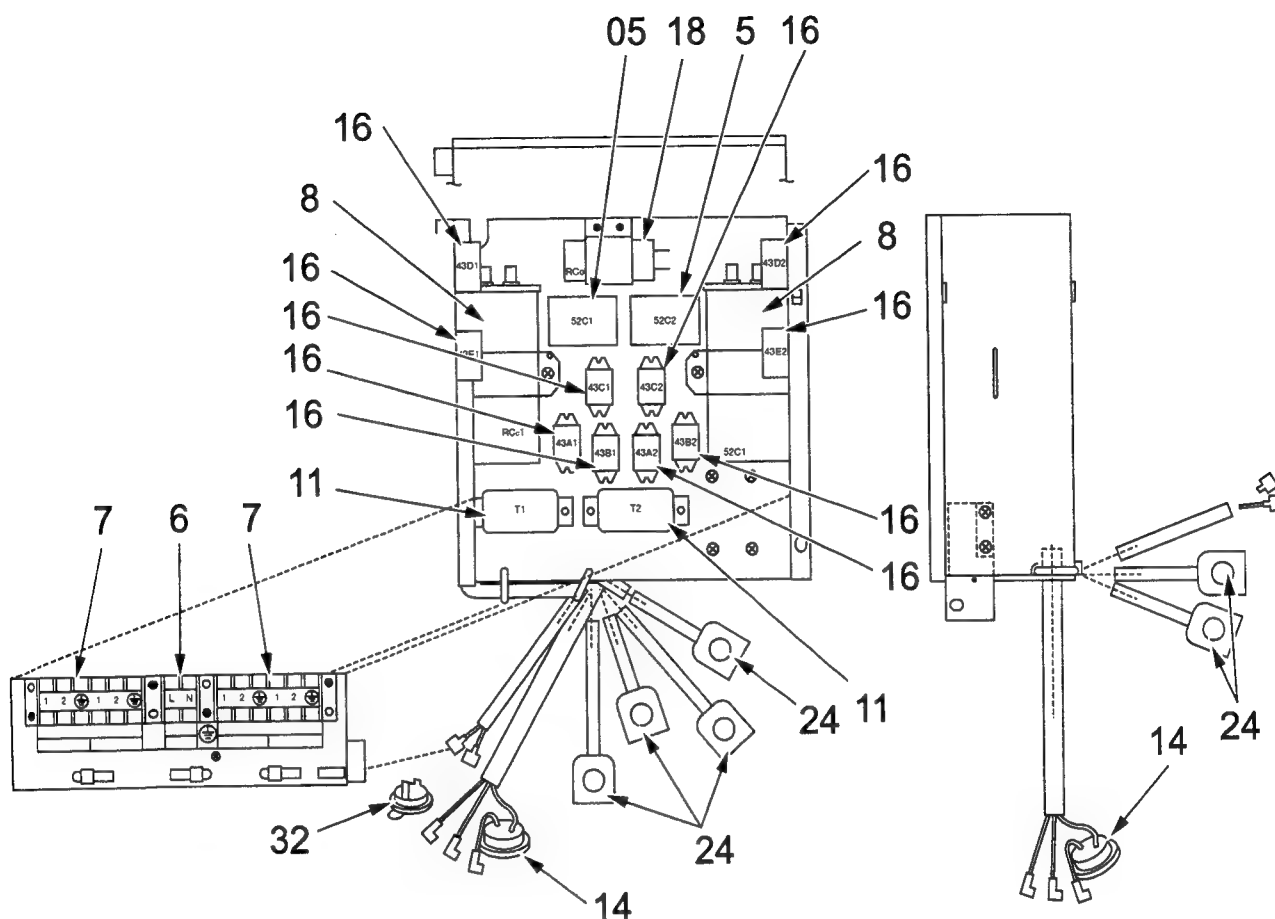


| Location No. | Part No. | Description |
|--------------|----------|---|
| 01 | 43120168 | Fan, Propeller |
| 02 | 43143701 | Condenser |
| 03 | 43041728 | Compressor, AC 220/240V, 50Hz, PH160X2-4L |
| 05 | 43154139 | Magnetic-Switch |
| 06 | 43160479 | Terminal, Block, 2P |
| 07 | 43160466 | Terminal, Block, 4P (RAV-4M241A) |
| 07 | 43160480 | Terminal, Block, 6P (RAV-4M241A-E) |
| 08 | 43055354 | Capacitor, Plastic Film, 35MFD, 400V |
| 10 | 43121636 | Motor, Fan, STF-200-63B |
| 11 | 43151250 | Timer, Thermal |
| 12 | 43191494 | Guard-Fan |
| 13 | 43046270 | Two-Way Valve |

| Location No. | Part No. | Description |
|--------------|----------|-------------------------|
| 14 | 43054380 | Relay, Overload |
| 16 | 43154141 | Relay, LY2F-L |
| 18 | 43155146 | Capacitor, Electrolytic |
| 19 | 43046229 | Packed Valve, 3/8 |
| 21 | 43046228 | Packed Valve, 6,35 |
| 22 | 43145103 | Dryer |
| 23 | 43119390 | Hanger |
| 24 | 43146443 | Solenoid Coil |
| 25 | 43047492 | Capillary Tube 1,7 Dia |
| 27 | 43047527 | Capillary Tube 2,0 Dia |
| 29 | 43049625 | Cushion, Rubber |
| 30 | 43069988 | Holder, OL-Relay |
| 32 | 43150220 | Bimetal Thermostat |
| 33 | 43046151 | Two-Way Valve |

9-2. Outdoor Unit

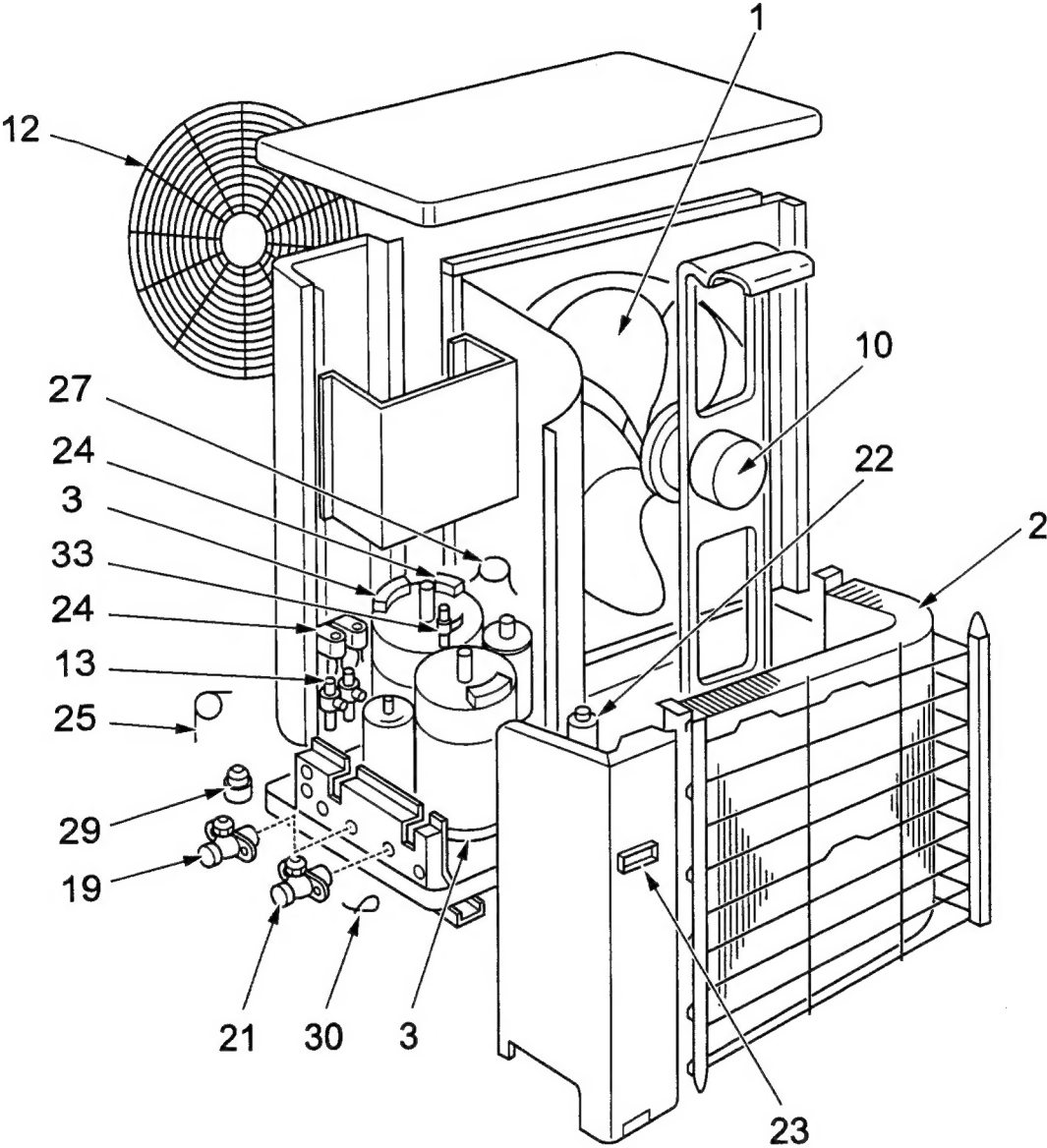


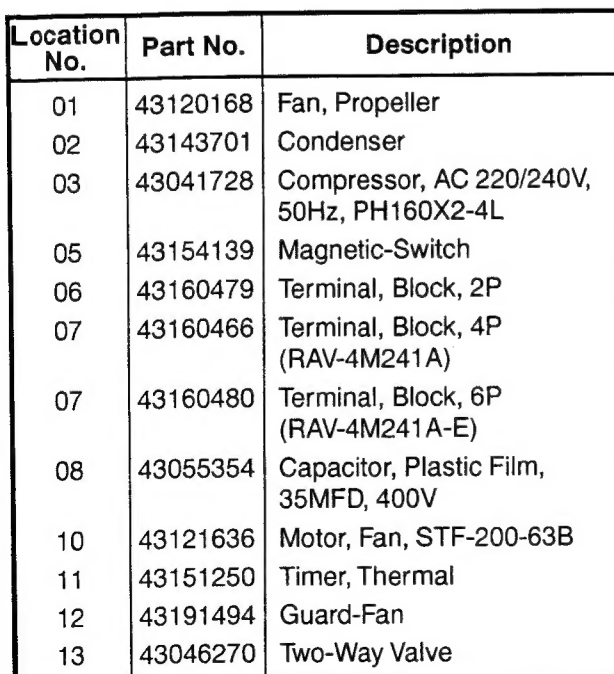


| Location No. | Part No. | Description |
|--------------|----------|---|
| 01 | 43120168 | Fan, Propeller |
| 02 | 43143701 | Condenser |
| 03 | 43041728 | Compressor, AC 220/240V, 50Hz, PH160X2-4L |
| 05 | 43154139 | Magnetic-Switch |
| 06 | 43160479 | Terminal, Block, 2P |
| 07 | 43160466 | Terminal, Block, 4P (RAV-4M241A) |
| 07 | 43160480 | Terminal, Block, 6P (RAV-4M241A-E) |
| 08 | 43055354 | Capacitor, Plastic Film, 35MFD, 400V |
| 10 | 43121636 | Motor, Fan, STF-200-63B |
| 11 | 43151250 | Timer, Thermal |
| 12 | 43191494 | Guard-Fan |
| 13 | 43046270 | Two-Way Valve |

| Location No. | Part No. | Description |
|--------------|----------|-------------------------|
| 14 | 43054380 | Relay, Overload |
| 16 | 43154141 | Relay, LY2F-L |
| 18 | 43155146 | Capacitor, Electrolytic |
| 19 | 43046229 | Packed Valve, 3/8 |
| 21 | 43046228 | Packed Valve, 6,35 |
| 22 | 43145103 | Dryer |
| 23 | 43119390 | Hanger |
| 24 | 43146443 | Solenoid Coil |
| 25 | 43047492 | Capillary Tube 1,7 Dia |
| 27 | 43047527 | Capillary Tube 2,0 Dia |
| 29 | 43049625 | Cushion, Rubber |
| 30 | 43069988 | Holder, OL-Relay |
| 32 | 43150220 | Bimetal Thermostat |
| 33 | 43046151 | Two-Way Valve |

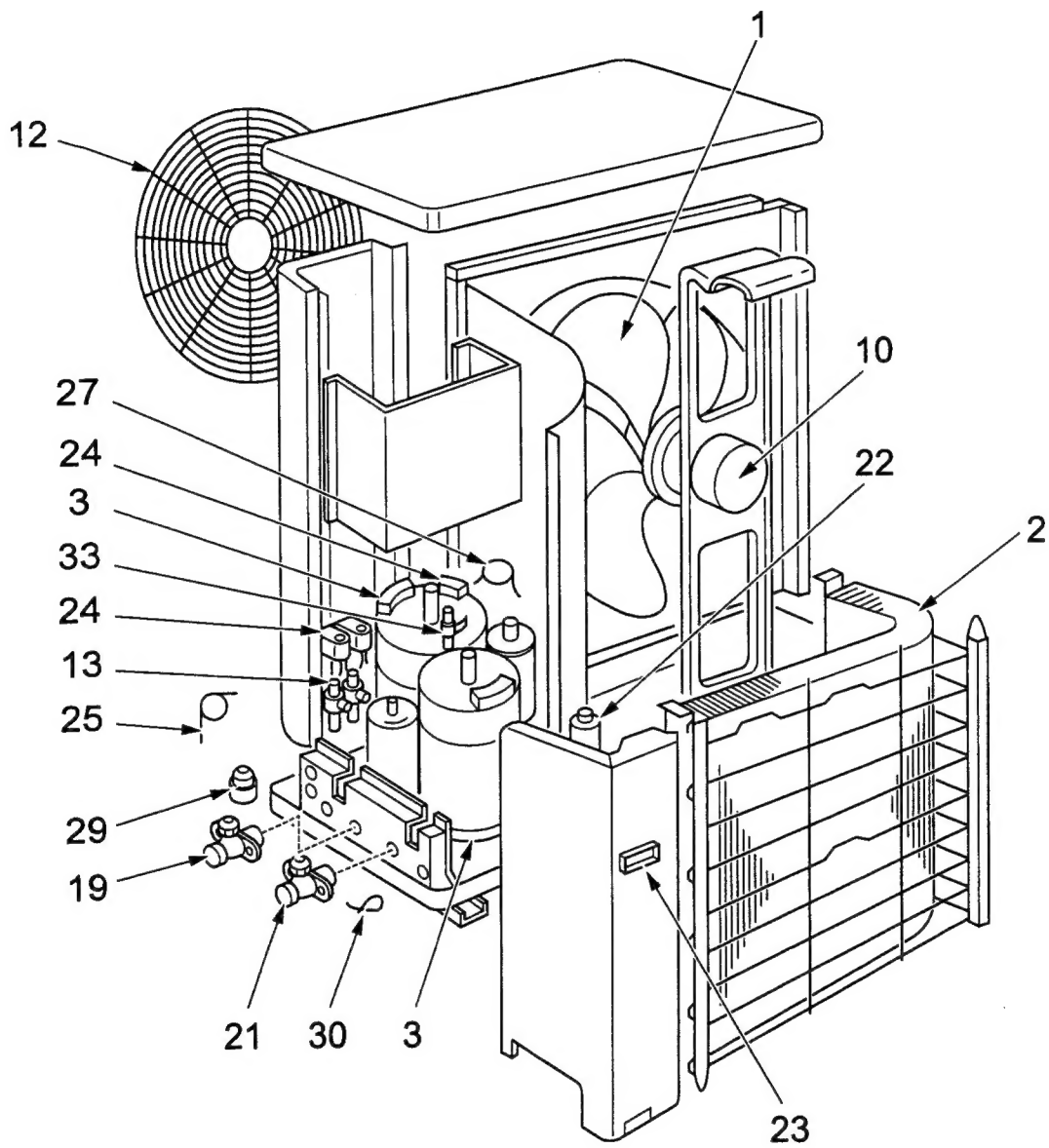
9-2. Outdoor Unit

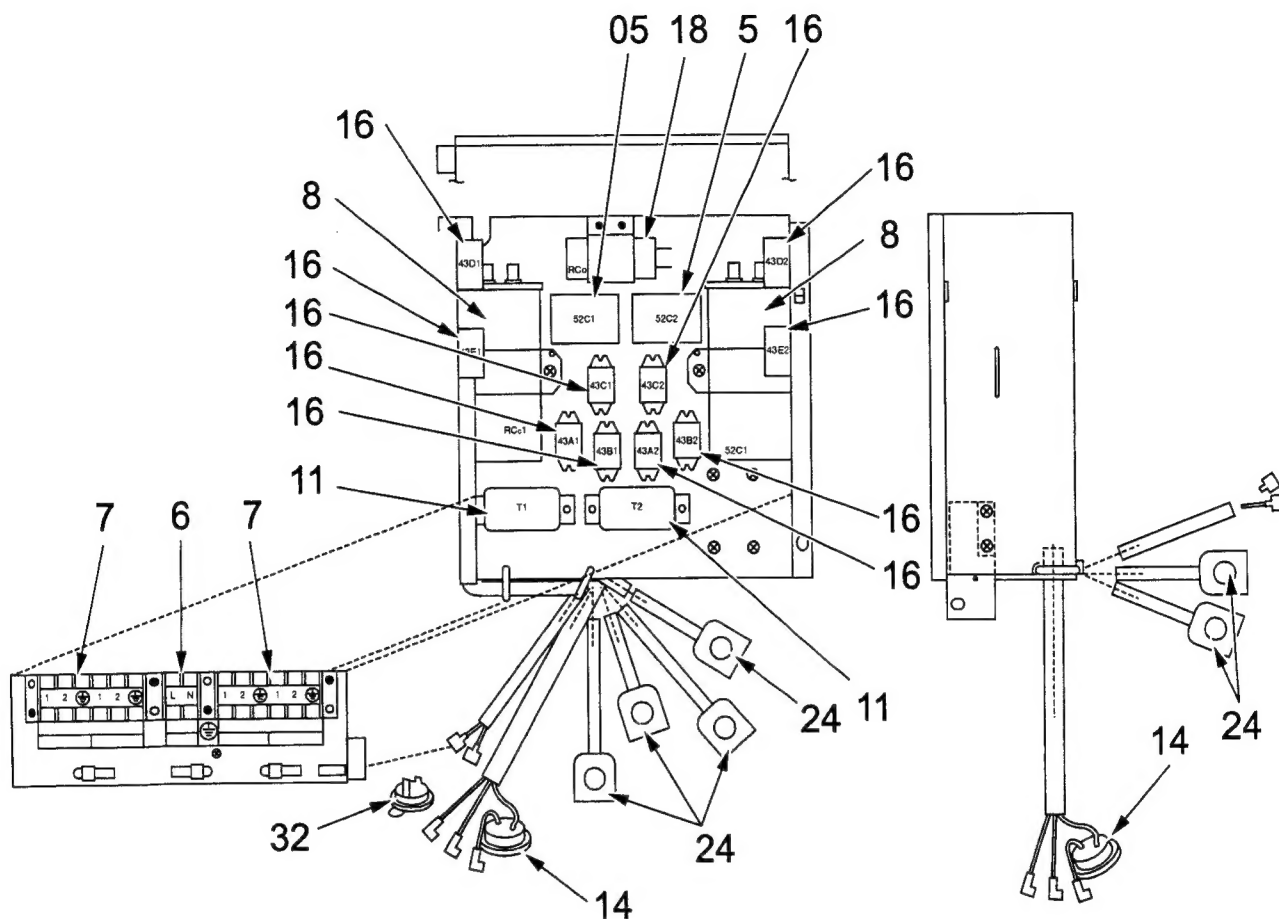




- 32 -

9-2. Outdoor Unit





| Location No. | Part No. | Description |
|--------------|----------|---|
| 01 | 43120168 | Fan, Propeller |
| 02 | 43143701 | Condenser |
| 03 | 43041728 | Compressor, AC 220/240V, 50Hz, PH160X2-4L |
| 05 | 43154139 | Magnetic-Switch |
| 06 | 43160479 | Terminal, Block, 2P |
| 07 | 43160466 | Terminal, Block, 4P (RAV-4M241A) |
| 07 | 43160480 | Terminal, Block, 6P (RAV-4M241A-E) |
| 08 | 43055354 | Capacitor, Plastic Film, 35MFD, 400V |
| 10 | 43121636 | Motor, Fan, STF-200-63B |
| 11 | 43151250 | Timer, Thermal |
| 12 | 43191494 | Guard-Fan |
| 13 | 43046270 | Two-Way Valve |

| Location No. | Part No. | Description |
|--------------|----------|-------------------------|
| 14 | 43054380 | Relay, Overload |
| 16 | 43154141 | Relay, LY2F-L |
| 18 | 43155146 | Capacitor, Electrolytic |
| 19 | 43046229 | Packed Valve, 3/8 |
| 21 | 43046228 | Packed Valve, 6,35 |
| 22 | 43145103 | Dryer |
| 23 | 43119390 | Hanger |
| 24 | 43146443 | Solenoid Coil |
| 25 | 43047492 | Capillary Tube 1,7 Dia |
| 27 | 43047527 | Capillary Tube 2,0 Dia |
| 29 | 43049625 | Cushion, Rubber |
| 30 | 43069988 | Holder, OL-Relay |
| 32 | 43150220 | Bimetal Thermostat |
| 33 | 43046151 | Two-Way Valve |